User Manual

MX 40

Integrated Alarm and Control System

Part Number: NPMX40EN
Revision: 1.0

OLDHAM

The Fixed Gas Detection Experts

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All of the information that is provided in this document is accurate to the best of our knowledge.

As a result of continuous research and development, the specifications of this product may be changed without prior notice.

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Table of Contents

Table of Figures ..... **iv**
List of Tables ..... **v**
1.0 Introduction **1**
1.1 Features 1
1.2 LCD Main Display Function 2
1.3 Modbus™ Communication 2
1.4 Secure Digital Card (SD Card) 2
1.5 I/O Modules and Connections 2
1.6 Enclosure Types 4
1.7 Alarms and Fault Condition 4
1.8 System Operation 5
1.9 Operator Interface 6
1.9.1 Magnetic Programming Tool 7
1.9.2 Front Panel User Interface 7
1.10 Main Display Functions 8
1.10.1 Sensor Group 8
1.10.2 Transceiver Group 8
1.10.3 RL4/BM 25W/Alarm Stations Group 9
1.10.4 AO-4 Group 9
1.11 Menu Function 9
1.12 Optional Remote Alarm Reset/Acknowledge Switch 10
1.13 Wireless Option 11
2.0 Installation **13**
2.1 Safety Guidelines 13
2.2 Enclosure Installation 13
3.0 I/O Connections **19**
3.1 I/O Module Installation 19
3.2 Analog 4-20mA Sensor Inputs (DA-4) 20
3.3 Dry Contact Inputs (DI-4) 21
3.4 Analog 4-20mA Outputs (AO-4) 22
3.5 Alarm Relay Outputs (RL-4) 24
3.6 RS-485 Serial Gas Sensors 26
3.7 Wireless BM 25W standalone gas monitors 26
3.8 General Installation Wiring Notes 27
3.9 Initial Start-Up 27
4.0 Secure Digital Card **29**
5.0 System Configuration **29**
5.1 MX 40 Controller Setup 29
5.2 Menu Functions 29
5.2.1 Auto Configure System 30
5.2.2 Setup Channel Data 31
5.2.3 Set Channel Alarms 31
5.2.4 Set Relay (Alarm) Functions 32
5.2.5 Inhibit and Alarm Test Mode 33
5.2.6 System Diagnostics 34
5.2.7 Time and Date 34
5.2.8 View TWA and Peak 35
6.0 Modbus™ Slave Communications Port **37**
6.1 Modbus™ Register Map 37
7.0 Remote Alarm Reset/Acknowledge Switch Installation **39**

8.0 Troubleshooting Guide 41
8.1 Replacement of the NEMA 4 Drop-In Display Assembly 41
9.0 Customer Support and Service Policy 43
10.0 Warranty Notice 45
11.0 Appendix 47
11.1 Specifications 47
11.2 Hexadecimal Table 48
11.3 Utilities 49
11.3.1 Set Channel Data 49
11.3.2 Set RF Silence and RF Sleep (Wireless Function Only) 51
11.3.3 Set Low Battery Alarms 51
11.3.4 Set Modbus™ Address 51
11.3.5 CXT Low Battery Threshold 51
11.3.6 Module Update Interval 52
11.3.7 Set COMM Baud Rates 52
11.3.8 Set Modbus™ Timeouts 52
11.3.9 Display Settings 53
11.4 Spare Parts and Wireless Accessories 53
11.5 Revision Log 54
12.0 EC Declaration of Conformity 55

Table of Figures

Figure 1 MX 40 Controller 1
Figure 2 Menu Flow Chart 6
Figure 3 Magnetic Programming Tool 7
Figure 4 Front Panel User Interface 7
Figure 5 Radio Module 11
Figure 6 MX40-08-N4X Controller Mounting and Dimensional View 14
Figure 7 MX40-32-N4X Controller Mounting and Dimensional View 14
Figure 8 N4X Protective Earth Connector 15
Figure 9 Display Wiring 16
Figure 10 Cable Entry Points 16
Figure 11 N4X AC/DC Inputs 17
Figure 12 N4X RS-485 Master Port Connections 17
Figure 13 N4X RS-485 Slave Port Connections 18
Figure 14 N4X Antenna Connector 18
Figure 15 I/O Module Installation 19
Figure 16 Model DA-4 4-20mA Input Module and 4-20mA Gas Sensor Connections 20
Figure 17 Model DA-4 4-20mA Input Module and 4-20mA Gas Sensors 21
Figure 18 Model DI-4 Contact Input Module 22
Figure 19 Model AO-4 4-20mA Output Module 23
Figure 20 Model RL-4 Relay Output Module 24
Figure 21 Modbus™ Gas Sensor Connections 26
Figure 22 N1P & N4X Remote Switch Input 39
Figure 23 N7 Remote Switch Input 39
Figure 24 Oldham C1D1 Switch Connections 39
Figure 25 NEMA 4 Drop-In Display Assembly 41

List of Tables

Table 1 AO-4 Modbus™ Addresses 23
Table 2 RL-4 Relay Modbus™ Addresses 25
Table 3 MX 40 Register Map 37
Table 4 Hexadecimal Conversion Table 48

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1.0 Introduction

1.1 Features

The Oldham MX 40 controller (Figure 1) is a multi-channel gas detection control system. The MX 40 serves as a host monitor/controller for a network of gas detection sensors and various other field devices. The controller offers a non-intrusive magnetic interface with backlit LCD display and Modbus™ technology that supports either wireless or a hard wire sensor connection. The MX 40 is equipped with an auto configure feature to automatically search the Modbus™ addresses for various Oldham equipment associated with the controller and adds the equipment to the controller without user intervention.

Remote mounted gas detection sensors include any analog 4-20mA or RS-485 (Modbus™) serial devices such as;

- toxic gas,
- combustible gas, or
- oxygen deficiency sensors.

Remote field devices include contact closure inputs such as:

- liquid level,
- temperature,
- pressure, or
- smoke detection devices.

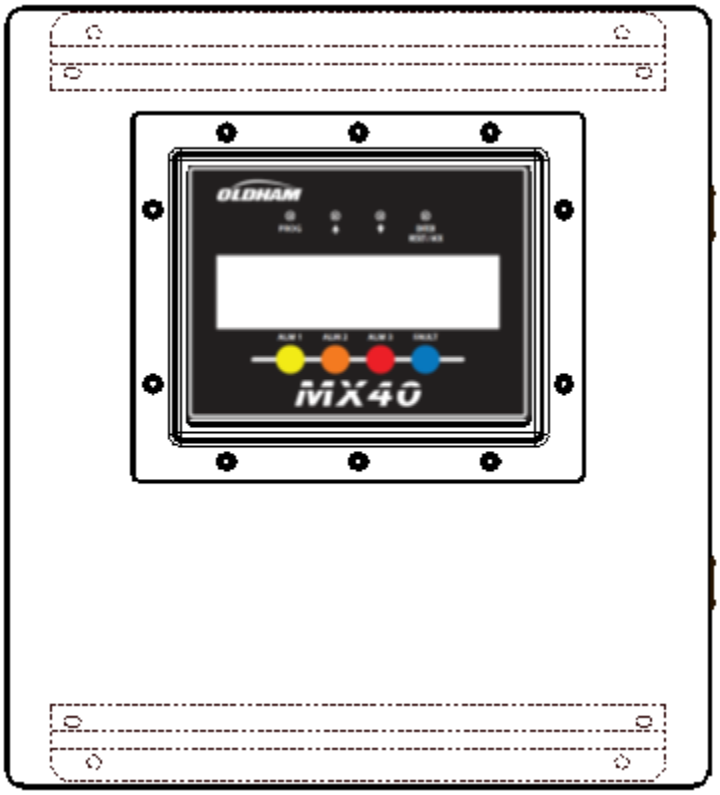

Figure 1 MX 40 Controller

1.2 LCD Main Display Function

The main display is an $1^1/_4$" x 6" backlit LCD that is four lines by forty characters and displays up to eight configured channels at one time. The four internal magnetic switches are located above the backlit LCD display and offer basic navigation for a complete configuration of the controller (Section 5.1).

Real time sensor status includes:

- channel number
- gas concentration,
- device tag (gas type)
- alarm/fault status.

Each channel displays the current status of three alarm levels and a fault condition on the front panel LED indicators.

1.3 Modbus™ Communication

The controller uses the RS-485 Modbus™ RTU protocol to communicate with RS-485 serial sensors and I/O modules. A secondary Modbus™ port is addressable by a PLC, PC/HMI, DCS or other Modbus™ RTU master-polling devices.

Primary Modbus™ Interface (COMM1 Master)
Uses two-wire half duplex RS-485, 9600 baud, 8 data bits, 1 stop bit, no parity. Communicates directly with Modbus™ capable sensors and Oldham's independently addressable I/O modules that operate on 11.5-30VDC.

Secondary Modbus™ Interface (COMM2 Slave)
The Modbus™ slave interface communicates with the remote display or an additional controller.

1.4 Secure Digital Card (SD Card)

The MX 40 controller allows data logging when an SD memory card is installed. The card must be installed on the back of the PCA (printed circuit assembly) before the controller is powered up. The controller will automatically format the card (Section 4.0) and create the necessary files for data logging.

NOTE	Data logging does not occur during the first 10 minutes after power-up of the unit. This delay allows the sensors time to stabilize, so that inaccurate or faulty readings will not be logged during this stabilization period.

1.5 I/O Modules and Connections

A maximum of 32 sensor channels are configurable for the MX 40 models and are customizable using Oldham's I/O modules. A maximum of 16 BM 25W wireless standalone gas monitors are configurable for the MX 40 models. Accommodation for the I/O modules relies on the type of enclosure utilized. Seamless system expansion is accomplished through DIN rail mounted and stackable modules. The modules communicate with the controller using Modbus™ technology and are available in four types;

- 4-20mA inputs
- dry contact inputs
- 4-20mA outputs
- relay outputs.

The analog sensors and analog field devices interfaced to the I/O modules communicate with the COMM1 Modbus™ master port on the MX 40 controller via the I/O Module. Serial sensors interface directly with the COMM1 port and do not require I/O modules. The types of sensors/field devices interfaced will dictate the I/O modules required for the MX 40 controller. Configuration inputs are completely field-configurable providing a distinctive combination of flexibility and expansion for the customer.

I/O modules are factory installed unless specifically instructed otherwise. The number of I/O modules that can be installed in the MX 40 enclosure is dictated by the enclosure due to physical space limitations. Additional I/O modules in excess of the maximum allowed for each enclosure must be mounted in a separate enclosure by the customer. The module limits for each enclosure varies dependent on the type of enclosure, and the set-up of the particular unit. The typical limitations are as follows:

- MX40-08-N4X enclosure - maximum of six I/O modules inside
- MX40-32-N4X enclosure - maximum of twelve I/O modules inside

The MX 40 controller can be configured for various I/O module combinations at the Oldham factory. Customer application/site specific information must be provided on the Configuration Form. Information provided is verified for correct quantity and type of I/O modules to support application/site requirements. The customer should supply the following site specific information:

1. Number of gas/sensor channels.
2. Oldham sensor model number and I/O type (Modbus™ or 4-20mA) for each channel.
3. Range, units, and gas type for each channel.
4. Alarm level(s) for each gas channel.
5. Device Tag for each channel.
6. Assignment and set-up information for each relay contact.
7. Analog output requirements for each channel.

NOTE	The set-up configuration is executed by the user in the field (Section 5.0). Modifications to are expected to take place on site due to requirement changes and/or system expansions.

Oldham I/O Modules (Purchased Separately)

Analog 4-20mA Sensor Inputs (DA-4)

- Provides power to any two or three wire field sensors
- Receives standard 4-20mA signal outputs from the sensors
- Four 4-20mA inputs to support up to four sensors
- Uses RS-485 Modbus™ RTU protocol to communicate with the controller and must have a unique Modbus™ address set between 01 and 7Fh.

Dry Contact Inputs (DI-4)

- Relay contact outputs from field devices can be connected
- Four relay contact inputs
- Can be installed on the DIN rail of the controller
- Uses RS-485 Modbus™ RTU protocol to communicate the state of the contact outputs from field devices and must have a unique Modbus™ address set between 01 and 7Fh.

Analog 4-20mA Outputs (AO-4)

- Provide a 4-20mA output equal to the current concentration reading reported to the controller for the associated channel.
- Uses RS-485 Modbus™ RTU protocol to receive the 4-20mA output levels. AO-4 modules must have a unique Modbus™ address set between A1 and A8h.

Alarm Relay Outputs (RL-4)

- Alarms can be used to control (fire) annunciating devices or signal inputs to other control devices.
- Four Form C, Single Pole Double Throw (SPDT), 5 Amp relay contacts each assigned specifically to one alarm.
- Uses RS-485 Modbus™ RTU protocol to communicate the outputs and must have a unique Modbus™ address set between 80 and 8Fh.
- The MX 40 controller is configured with a maximum of eight separate relay banks each holding up to two RL-4 modules.
- Anytime a specific alarm (e.g. Alarm 3) is fired for a particular module in a bank (e.g. Bank2), all corresponding alarms (e.g. Alarm 3's) for all modules in that particular bank (e.g. Bank2) are also triggered.

RS-485 Serial Gas Sensors (Modbus™)

RS-485 Serial gas sensors can be interfaced directly with the MX 40 controller without the use of I/O modules by connecting the sensors in a series to the primary RS-485 Modbus™ interface (RS-485 Master Port).

1.6 Enclosure Types

The MX 40 controller is available in N4X enclosure. The number of I/O modules varies depending on the enclosure type and configuration.

N4X Enclosure

The MX 40 controller is available in two different size models for the N4X enclosure type. Both the MX40-08-N4X and MX40-32-N4X controllers are housed in a NEMA 4X water/corrosion proof enclosure for indoor/outdoor use. The power supplies for both enclosure types are capable of handling AC inputs from 100-120/220-240VAC, 50-60Hz without degradation. The MX40-N4X can be powered by an external DC source that meets the input requirements (11.5-30VDC) of the MX 40 if AC power is not preferred or available. This input can be used for primary power or back-up power in the event of an AC power failure. The DC output voltage is capable of delivering a maximum of 2 Amps of current to the sensors attached to the MX 40 controller.

RS-485 master port and power out are provided for connection to serial sensors attached to the unit.

The MX40-08-N4X enclosure houses a maximum of six I/O modules inside of the controller and is capable of communicating with a maximum of 32 devices. The enclosure can incorporate integral alarms such as an 8" strobe mounted on the top of the enclosure, horn, or both.

The MX40-32-N4X enclosure houses a maximum of twelve I/O modules inside of the controller and communicates with up to 32 devices.

1.7 Alarms and Fault Condition

The alarms (Alarm 1, Alarm 2, Alarm 3, and Fault) can be used to control annunciating devices or as signal inputs to other control devices. The field configurable magnetic user interface permits alarm values and fault condition to cause an assigned relay or bank of relay outputs to fire, triggering external alarm devices. The assigned relay outputs will return to normal state when a gas alarm or a fault condition clears. Additionally, an external manual switch can be wired to the MX 40, acting as an acknowledge/reset switch (Section 1.12).

When the MX 40 is in alarm, the display will remain on the channel group with the alarm. When there is more than one alarm/fault, the controller will cycle through group pages with alarms/faults including the

transceiver, RL-4/alarm station, and AO-4 group pages. The user can manually cycle to any group page that exists using the arrow switches. After a time out period, the MX 40 will resume page cycle protocols based upon the existence of alarms/faults. Four LED indicators on the front panel show alarm/fault alarm output status and are labeled respectively as ALM 1 (yellow), ALM 2 (yellow), ALM 3 (red), and FAULT (blue).

All alarms can be configured Energized/De-Energized, Latching/Non-Latching and Silenceable/Non-Silenceable for the relays.

Energized Mode

The normally open contact is closed if the alarm level has not been reached or if the sensor is not in fault. Energized mode provides for fail-safe operation since a loss of power or cable failure will cause the contact to be open.

De-Energized Mode

The normally open contact is open if the alarm level has not been reached or if the sensor is not in fault.

Silenceable

The corresponding alarm LED and relay can be deactivated by acknowledging the Alarm Silence function on the front panel of the MX 40 controller or by activating the external acknowledge switch if installed (Section 7.0).

Non-Silenceable

The corresponding alarm LED and relay will remain activated until the cause of the alarm or fault is clear.

Latching Mode

The relay can be deactivated after the alarm condition has cleared by acknowledging the Alarm Reset function on the front panel of the MX 40 controller or by activating the external reset switch if installed (Section 7.0).

Non-Latching Mode
The relay is deactivated as soon as the sensor alarm or fault condition is clear.

1.8 System Operation

The setup of the controller is critical for proper operation. Modbus™ addresses must be correct on all the devices connected to the controller before the controller will acknowledge the devices. Each wireless sensor must have a unique Modbus address (refer to sensor manual for details). The number of sensors is determined during auto configure if the addresses on the sensors and modules are set correctly.

The operator interface of the MX 40 utilizes four internal magnetic switches located above the controller's backlit LCD display. The four switches provide a non-intrusive interface and allow for complete configuration of the controller and are labeled as follows:

- **PROG,**
- ↑ (Up Arrow),
- ↓ (Down Arrow) and
- **ENTER.**

The ENTER switch also doubles as a RESET/ACK switch from the Main Display only (not in Menu Mode).

1.9 Operator Interface

Reference the Menu Flow Chart (Figure 2) to learn how to easily navigate the menus and make changes.

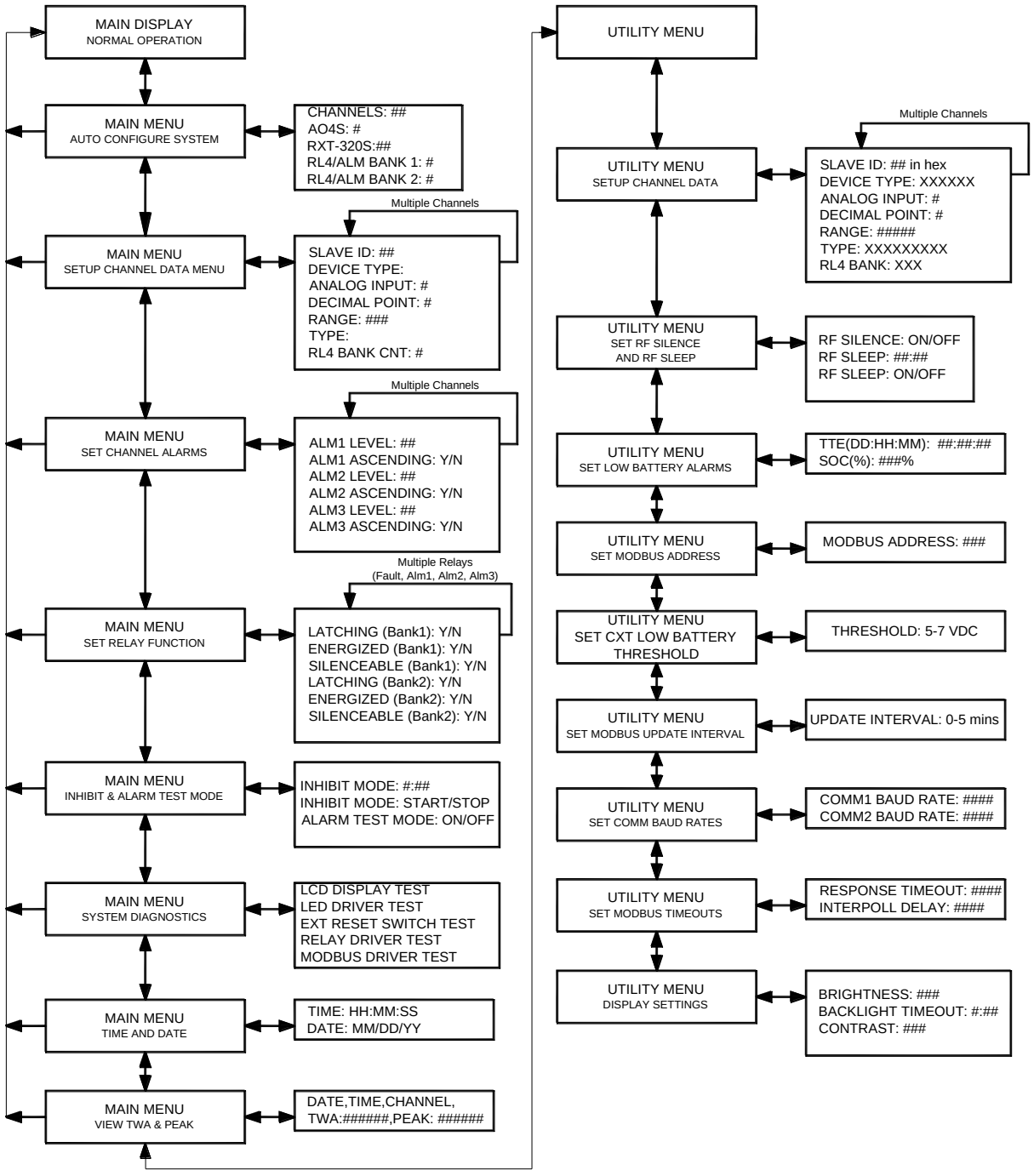

Figure 2 Menu Flow Chart

1.9.1 Magnetic Programming Tool

The magnetic programming tool (Figure 3) is used to operate the magnetic switches. For switch activation, the programming magnet is briefly held on the switch marker (⊗) and then removed. This action will be referred to as a "swipe" for the remainder of this manual.

Figure 3 Magnetic Programming Tool

1.9.2 Front Panel User Interface

The front panel user interface (Figure 4) contains four switches necessary to configure the MX 40 controller.

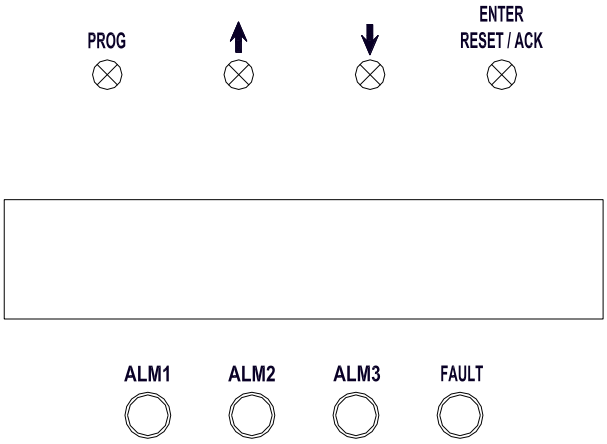

Figure 4 Front Panel User Interface

PROG Switch
From the Main Display, the PROG switch enters into the Main Menu. Once inside the Main Menu, the PROG switch acts as an "Escape" switch that moves backwards in the menu flow chart.

NOTE	While in Main Menu mode there are no updates to gas readings and hence no alarms will take place.

↑ Up Arrow Switch
This switch moves the user up the Main Menu flow chart. It is also used to change selected entries in the menu selections in the upward direction.

↓ Down Arrow Switch
This switch moves the user down the Main Menu flow chart. It is also used to change selected entries in the menu selections in the downward direction.

ENTER and RESET/ACK Switch

This switch has multi-purpose use:

- The ENTER function is used to accept selections in all menu screens and to execute the Reset and Acknowledge functions.
- The Reset function releases all latched relays once the alarm/fault condition has cleared.
- The Acknowledge function will disengage any silenceable relays that are in an active state. This is used to silence alarms once the end-user has assessed the alarm condition.
- The RESET/ACKNOWLEDGE function of the switch is only applicable from the Main Display and not while in Main Menu mode.

1.10 Main Display Functions

When the MX 40 is in alarm, the LCD display will stay on the channel group with the channel in alarm. If more than one alarm/fault exists, the MX 40 will cycle through group pages with alarms/faults including the transceiver, RL-4/alarm station, and AO-4 group pages. At any time the user can manually cycle to any group page using the arrow switches. After a time out period (15 seconds), the MX 40 will resume page cycle protocols based upon the existence of alarms/faults. Four LED indicators on the front panel show alarm and fault alarm output status. The LEDs represent ALM 1 (yellow), ALM 2 (yellow), ALM 3 (red) and FAULT (blue).

NOTE	The MX 40 only cycles through sensor group pages when no alarms/faults exist.

1.10.1 Sensor Group

XX> YYY "Device Tag" #ZZ

XX – represents the corresponding channel number

YYY – the gas concentration value

"Device Tag" – Either user enter tag or:

- IN ALARM# = If any channel is in any gas alarm condition, # is the alarm level.
- IN FAULT = If any gas channel is in fault.
- COMM ERR = If any channel is not appropriately communicating with the device.

ZZ – represents the corresponding BM 25W address if any BM 25W is used.

1.10.2 Transceiver Group

WTXX 'Status' YYY%

XX – represents the transceiver Modbus™ slave address.

'Status' – Status message of the alarm station.

- OFFLINE = Not communicating.
- DC POWER = Communicating; line powered.
- BATT ERR = Communicating; cannot read smart battery pack.
- LOW BATT = Communicating; battery life is below the set threshold.
- 45+ DAYS = Communicating; smart battery pack has more than 45 days before empty.
- 0-45 DAYS = Communicating; the number of days until smart battery pack is empty.
- x.xxV = Communicating; the voltage of the installed non-rechargeable battery

YYY% - represents the link quality of the transceiver.

1.10.3 RL4/BM 25W/Alarm Stations Group

Hardwired RL4 Module

RMXX> 'Status'

XX – represents the RL4 Modbus slave address.

'Status' – Status message of the RL4 module.

- COMM ERR = Not communicating with module.
- RL4 MODULE = Communicating with module.

Wireless Alarm Stations

ASXX 'Status' YYY%

XX – represents the alarm station Modbus slave address.

'Status' – Status message of the alarm station.

- OFFLINE = Not communicating.
- DC POWER = Communicating; line powered.
- BATT ERR = Communicating; cannot read smart battery pack.
- LOW BATT = Communicating; smart battery state of charge below the set threshold.
- 0 – 100% = Communicating; current state of charge of the smart battery pack.

YYY% - represents the link quality of the alarm station.

1.10.4 AO-4 Group

AMXX> 'Status'

XX – represents the AO-4 module Modbus slave address

'Status' – Status message of the AO - 4 module

- COMM ERR = Not communicating with module
- AO-4 MODULE = Communicating with module

1.11 Menu Function

The MX 40 controller setup is accomplished through the Main Menu and consists of seven menu items:

1. Auto Configure System
2. Setup Channel Data
3. Set Channel Alarms
4. Set Relay Function
5. Inhibit & Alarm Test Mode
6. System Diagnostics
7. Time and Date
8. View TWA & Peak

Auto Configure System

The Auto Configure System automatically configures the MX 40 controller when other Oldham devices are installed as part of the control system. When activated, the controller searches for Oldham serial sensors, BM 25W, RL-4 modules/alarm stations, AO-4 modules and wireless radio modules.

Setup Channel Data

Setup Channel Data displays the Modbus ID, device type, range, and gas type for each channel. The assigned RL4 bank and number of analog inputs (for channels using an RXT-320) is also displayed. Only the gas type (except BM 25W) can be changed by the user. No other values on this screen can be changed.

Set Channel Alarms
All sensors have three alarm settings ALM1 (Alarm 1), ALM2 (Alarm 2) and ALM3 (Alarm 3). The user establishes (except BM 25W) the alarm levels for each sensor depending on the range. The values represent the alarm level set points and entered in 5% increments of the full-scale range selected for that channel. In ascending mode the relay is activated when the concentration is *above* the alarm threshold. In descending mode, the alarm relay is activated when the concentration is *below* the alarm threshold. Alarms are usually ascending, with the exception of oxygen sensors. The alarm ascending level can be either Y (Yes) or N (No).

Set Relay (Alarm) Functions
The Set Relay Functions menu enables configuration (Latching, Energized and Silenceable) of the relays in Bank1-8. Each relay bank has three relay outputs for ALM1, ALM2 and ALM3 and a fourth relay output for the Fault condition. All relays in the bank must be configured for the following three settings:

- Latching or Non-Latching
- Energized or De-Energized,
- Silenceable or Non-Silenceable

Inhibit and Alarm Test Mode
The Inhibit and Alarm Test Mode permits the user to inhibit functionality of alarms in the network, simulate alarm conditions and verify relay contacts. The Inhibit mode disables alarm outputs while sensor are being calibrated or tested. The Alarm Test Mode simulates alarm conditions by increasing the gas readings from zero for all active gas channels at increments of 5% full scale then decrease back to zero and exit the test mode.

System Diagnostics
The System Diagnostics menu performs complete functionality tests for:

- LCD display
- Panel LED's
- External reset switch
- Relays
- Modbus™ interface

Time and Date
The Time and Date menu enables the user to effortlessly establish the time and date. The time will be displayed as military time (24hrs) in hours, minutes and seconds. The date will be displayed as the month, day and two digit year. If the time and/or date are not correct, they can be updated.

View TWA and Peak
The View TWA and Peak menu permits viewing the recorded time weighted average (TWA) and peak readings for each channel represented by its assigned gas sensor. The data is recorded on the SD card with the date, time, channel number, TWA and peak readings each time the controller polls a sensor. Data on the SD card is viewed by using the Oldham Log File Viewer application on a computer.

1.12 Optional Remote Alarm Reset/Acknowledge Switch

An optional remote Alarm Reset/Acknowledge switch enables the user to reset or acknowledge alarms without having to open the MX 40 enclosure. The switch is a normally open push button mounted on the bottom or side of the enclosure.

1.13 Wireless Option

The Model MX 40 controller offers a wireless option that uses Modbus™ technology to connect the controller and other devices to a wireless platform. The local Modbus™ communication uses a wireless grid of transceivers to broadcast information throughout the wireless network, creating a seamless network of Modbus™ devices that are not physically connected. The transceiver operates at 2.4GHz and conforms to non-licensed radio frequency usage worldwide. Spread spectrum technology supports integrity and security for the wireless network.

Wireless applications can be a single field device communicating with a host controller or multiple field devices forming a network of subscribers. Each device in the network is assigned a Network ID and a Modbus™ address. If radio communication is impossible due to distance or obstruction, each slave device is capable of locating an alternate route using an additional radio to communicate with the designated device. This innovative technology is designed to create a robust network that automatically routes around congestion and line-of-sight obstacles while improving throughput as subscriber device density increases. Refer to the Wireless Radio Module instruction manual for detailed information.

Wireless Radio Module Mounting

Oldham's wireless radio modules are factory installed. The radio module has a rotary dial for setting the RF channel. The radio module, wireless sensors, and wireless alarm stations must all be set to the same RF channel to operate correctly.

NOTE	The radio module, wireless sensors, and wireless alarm stations must all be set to the same RF channel to operate correctly.

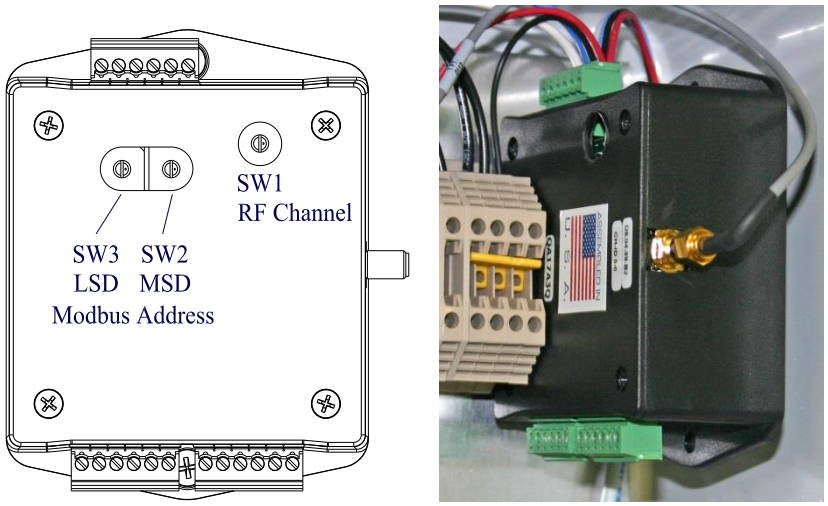

Figure 5 Radio Module

The antenna can be installed on the top of the enclosure or separated up to 50m using Oldham's remote antenna mounting kit (Section 2.2). Oldham's antennas are vertically polarized. This means that there is an RF 'Dead-Zone' directly above and below any transmitting antenna. Because of this, any device with an antenna that is located near an elevated antenna should be placed at least as far from the elevated antenna as the antenna is high. For example, if an antenna is 20ft. off the ground, the nearest antenna should be at least 20 ft. away.

2.0 Installation

2.1 Safety Guidelines

If equipment is used in a manner not specified by Oldham, the protection provided by the equipment may be impaired.

	CAUTION	The user must consult this manual for more information about any location marked with this symbol.
	DANGER	Danger of electrical shock. User must ensure that power has been disconnected prior to installation or servicing of the equipment.
	PROTECTIVE EARTH TERMINAL	This symbol identifies a terminal that is the connection point for a protective earth conductor. Only the protective earth conductor should be connected here.
	FUNCTIONAL EARTH TERMINAL	This symbol identifies a terminal that provides an earth ground reference point. These terminals are not for safety earthing purposes.

2.2 Enclosure Installation

CAUTION	**The power supply for the MX40-08-N4X controller can power a maximum of eight sensors even though the controller is capable of communicating with 32 devices. An additional power supply will be required if powering more than eight sensors or an upgrade to Model MX40-32-N4X is needed which can power a maximum of 32 sensors. Damage to the power supply may result if the maximum number of sensors is exceeded.**
CAUTION	The wall attachments must be able to withstand a force four times the weight of the equipment.
CAUTION	The MX 40 must be mounted in a location that does not impair the operation of the external disconnection device. Internal Disconnect Terminal Blocks are provided for the removal of power at the unit when needed.

1. Securely mount the enclosure in accordance with the dimensions provided in Figure 6 (MX40-08-N4X) or Figure 7 (MX40-32-N4X).

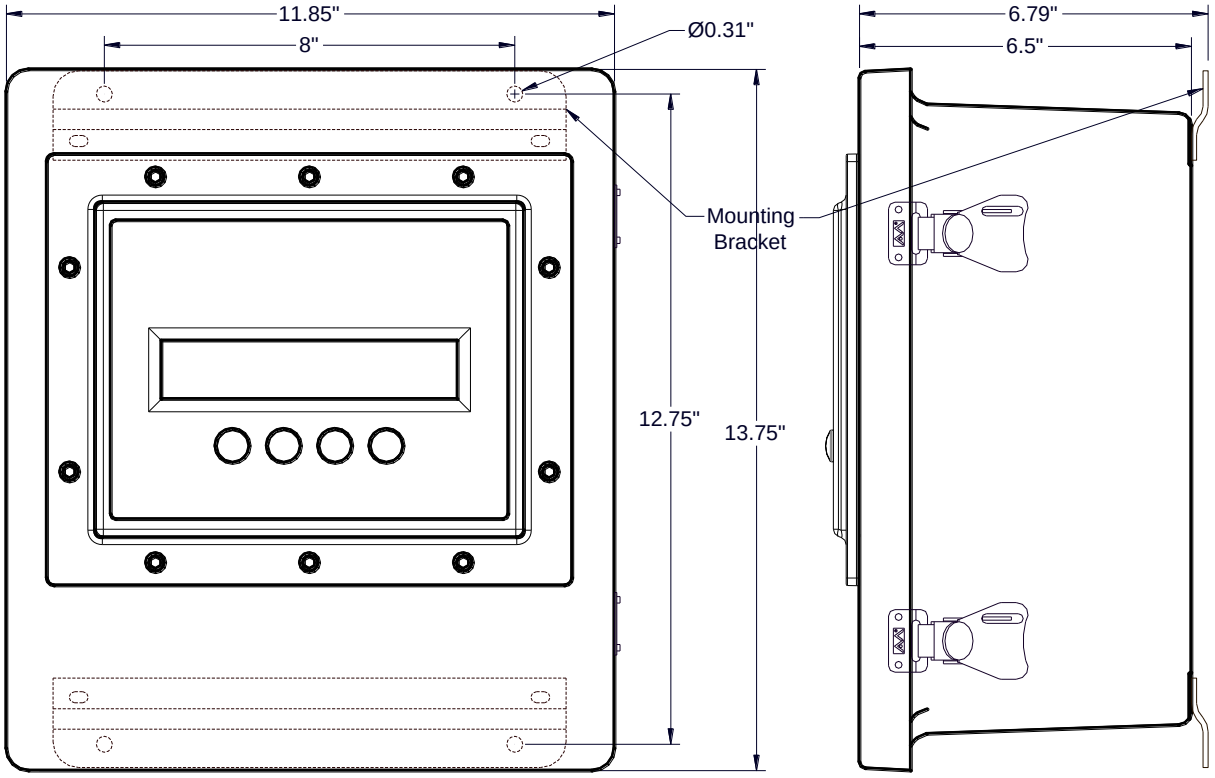

Figure 6 MX40-08-N4X Controller Mounting and Dimensional View

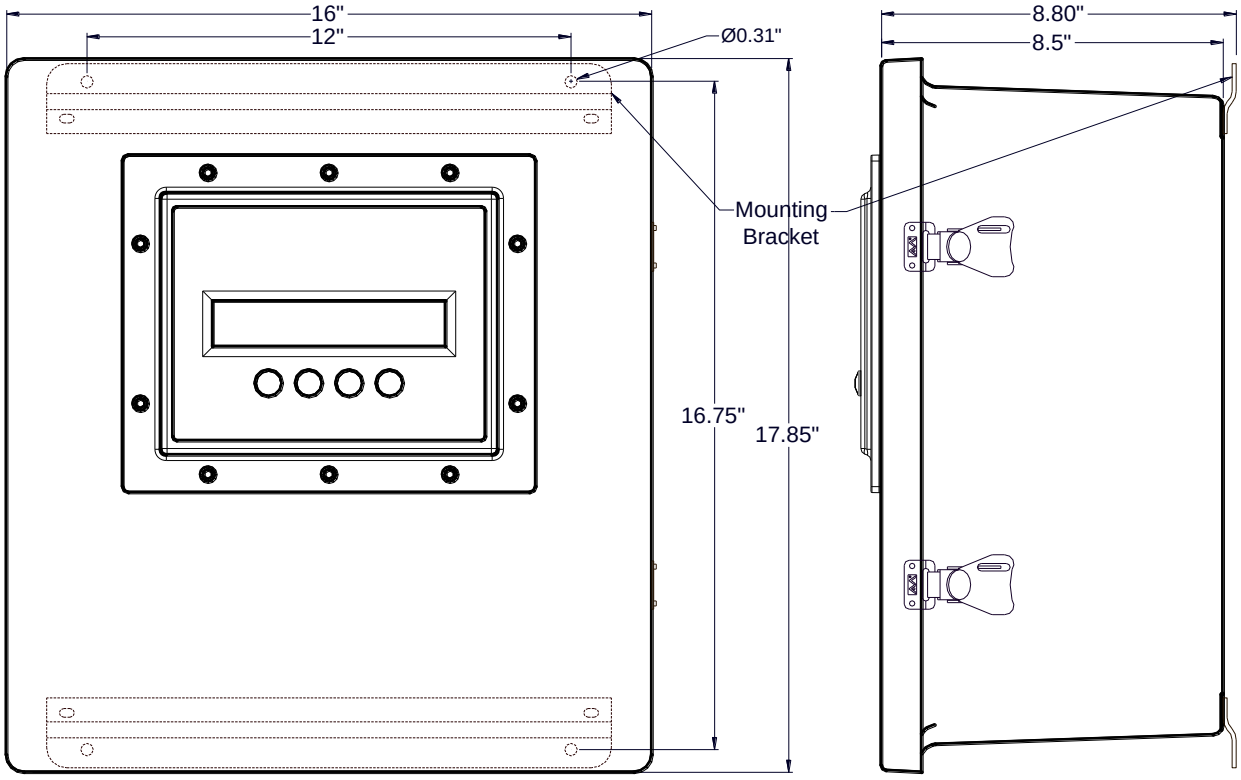

Figure 7 MX40-32-N4X Controller Mounting and Dimensional View

NOTE	If the AC and DC wiring are run in conduit, ensure that the AC wiring is not housed in the same conduit as the DC signal/wiring

NOTE	The internal power supply in the MX40-08-N4X and MX40-32-N4X converts 100-120/220-240VAC to 24VDC. Up to 2A @ 24VDC is available to power sensors attached to the MX 40. If more than 2A @ 24VDC is required, then the user must supply an additional power supply.

NOTE	The power supply for the MX40-08-N4X and the MX40-32-N4X are capable of handling AC inputs from 100-120/220-240VAC, 50-60Hz without degradation.

2. Install AC power as follows (Figure 11):
    a. Install AC power by connecting the 100-120/220-240VAC input wiring to the terminals labeled **VAC (L1)**, and **NEU (L2)**.

NOTE	The cable penetration for the AC power must be made in the bottom of the enclosure (See Figure 10). All penetrations must use a NEMA4 rated cable gland (Appleton P/N CG-2575 or equivalent) to prevent water ingress and restrict access to the internal circuits of the MX 40.

    b. Locate the ground terminal on the back plate of the N4X enclosure (Figure 8).
    c. Remove both nuts and the internal ground conductor
    d. Connect the protective earth conductor to the ground terminal with one lock washer, the protective earth conductor, a second lock washer on top of the conductor, a nut on top of the conductor, the circuit ground connector, and then a nut.

NOTE	Ensure that the protective earth conductor is connected directly to the ground terminal.

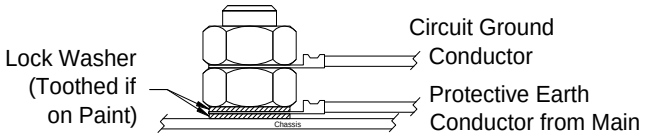

Figure 8 N4X Protective Earth Connector

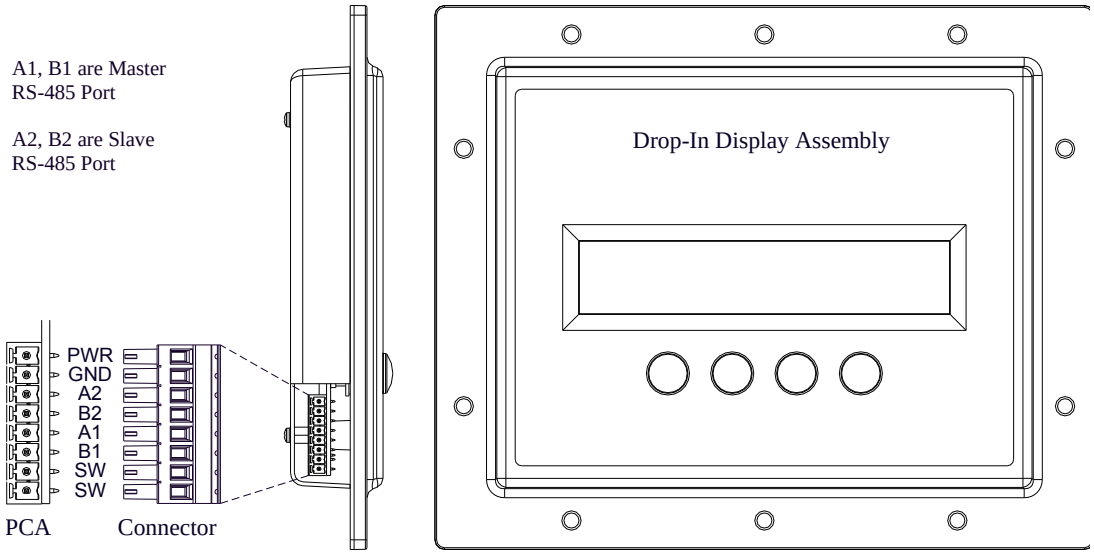

Figure 9 Display Wiring

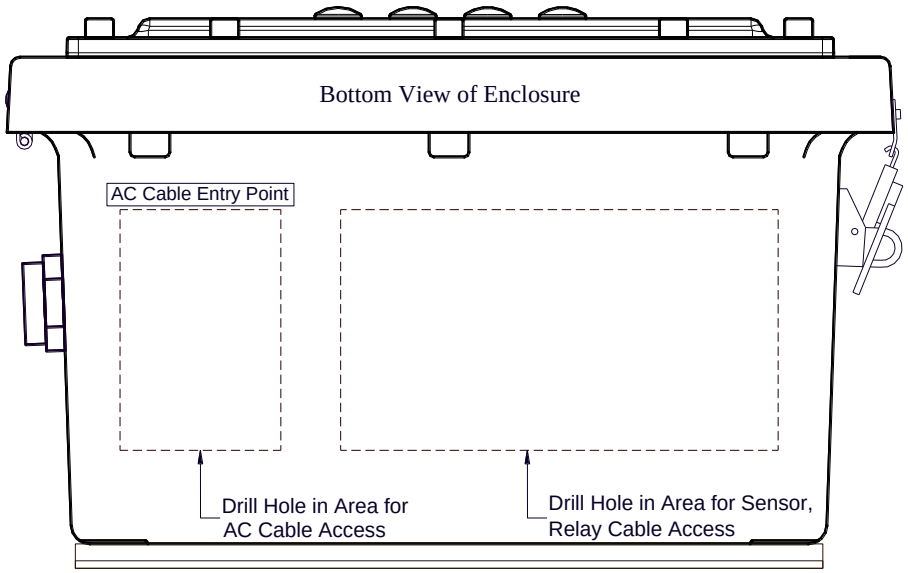
Bottom View of Enclosure
AC Cable Entry Point
Drill Hole in Area for
AC Cable Access
Drill Hole in Area for Sensor,
Relay Cable Access

Figure 10 Cable Entry Points

3. Tie the AC power conductors together with a tie-wrap.
4. To maintain the safety approval for the MX 40, the user must install a circuit breaker(s) near the MX 40 so that it can be easily reached and labeled as the power disconnection device for the MX 40. The installed AC circuit breakers should be rated for 3A.

NOTE	The equipment switch or circuit-breaker employed as a disconnecting device shall meet the relevant requirements of IEC 60947-1 and IEC 60947-3 and be suitable for the application. Internal Disconnect Terminal Blocks are provided for the removal of power at the unit when needed.

CAUTION	Equipment and equipment to be electrically connected shall use safety approved wire/cable in conjunction with appropriate and compatible protective cable gland, all of which meet the requirements of the max equipment rating (250VAC, 5A) and any local electrical codes, regulations and standards. The cable used to connect to the terminals of the MX40-32-N4X must be rated for a minimum of 105ºC.

5. Install the DC power as follows:
    a. Install external DC power by connecting the 11.5-30VDC to the terminals of the TB1 DIN rail mounted terminal block labeled **24VDC** and **DC Comm** (Figure 11). The equipment supply wiring must be safety approved and rated for at least 7.5A.

NOTE	The cable penetration for the DC power must be made in the bottom of the enclosure (See Figure 10). All penetrations must use a NEMA4 rated cable gland (Appleton P/N CG-2575 or equivalent) to prevent water ingress and restrict access to the internal circuits of the MX 40.

    b. To maintain the safety approval for the MX 40, the user must install an external disconnect switch or circuit breaker near the MX 40 so that it can be easily reached and labeled as the disconnection device for the MX 40. The installed DC circuit breaker should be rated for 5A.
    c. The unit does come equipped with Disconnect Terminal Blocks on the input power lines. These can be used to connect or disconnect power at the unit.

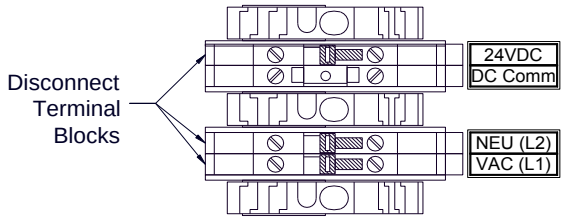

Figure 11 N4X AC/DC Inputs

6. Connect the external Modbus™ sensors at the RS-485 connections labeled **RS-485 Master** and '**A',** '**B',** and '**Shld'** (Figure 12).

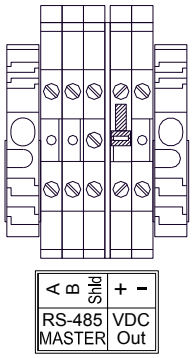

Figure 12 N4X RS-485 Master Port Connections

7. If 24VDC is required to power external sensors, connect the sensors to the power out labeled **VDC Out: '+' and '–'**.

8. If linking the MX 40 enclosure to an RD-64X remote display unit, connect the unit to the slave port terminals labeled **RS-485 Slave:** '**A',** '**B',** and '**Shld'** (Figure 13).

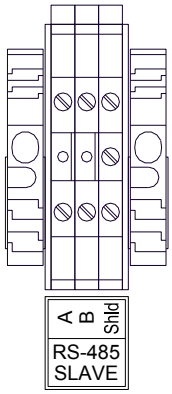

Figure 13 N4X RS-485 Slave Port Connections

9. If the MX40-N4X was ordered with the wireless option, the radio module is installed in the enclosure and an antenna connector is provided on the top of the enclosure (Figure 14). Mount the external antenna in an appropriate location with an unobstructed line-of-sight to the wireless devices. Connect the RF cable from the connector on top of the MX 40 to the antenna.

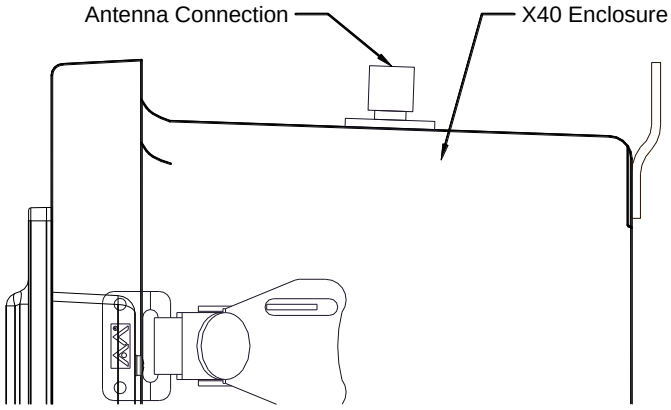

Figure 14 N4X Antenna Connector

Any slave device near an elevated or remote mounted antenna needs to be at least as far from the antenna as the antenna is high. For example, if the antenna is 20ft. high, then the nearest slave device should be at least 20 ft. away.

3.0 I/O Connections

3.1 I/O Module Installation

NOTE	The quantity of I/O modules supported by the MX 40 NEMA 4 enclosures is dependent on the configuration of the controller.

NOTE	The MX40-N4X enclosures with alarm strobe and or horn have a minimum of one RL-4 module installed to power the alarms. This RL-4 should not be removed.

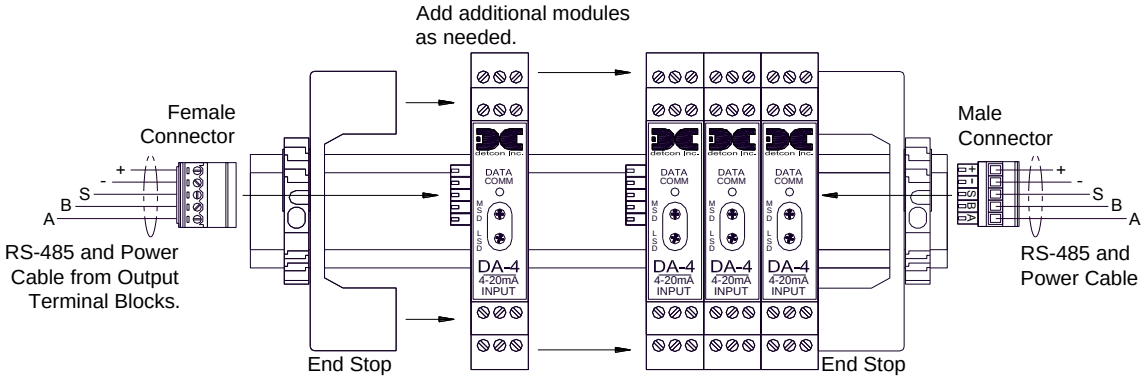

Figure 15 I/O Module Installation

I/O modules are mounted on an industry-standard 37.5 x 7.5 mm DIN rail (See Figure 15). Install the first I/O module at the end of the DIN rail nearest the male connector. Plug the male connector into the side of the module. Slide it all the way to the end stop. Add additional modules next to the first module. When installing additional I/O modules, make sure there is about 0.5 inch clearance on either side of the module and snap the module onto the DIN rail (the 0.5" spacing is to allow for connector clearance). Once the I/O module is snapped onto the DIN rail, slide it towards the adjacent module and assure that it firmly plugs into it. Connect the RS-485 and power female connector to the last module installed on the DIN rail. Secure the modules with an end stop.

NOTE	The male and female connectors must be plugged into modules on opposite ends of the DIN rail. If these connectors are not properly installed, communication with other RS-485 devices will not be possible.

NOTE	If no I/O modules are installed in the controller, the male connector must be plugged into the female connector for the RS-485 to communicate.

NOTE	For addressable I/O modules or Modbus™ sensors that are located remotely from the controller, General Cable Commodore (P/N ZO16P0022189) is recommended for serial and power connections.

3.2 Analog 4-20mA Sensor Inputs (DA-4)

Connect the 4-20mA gas sensors to DA-4 4-20mA input modules. The DA-4 modules provide power to any 2-wire or 3-wire field sensors, and receive standard 4-20mA signal inputs from the sensors Figure 16.

NOTE	The terminals on the DA-4 module are rated for a maximum of 30VDC. They are designed to accept solid or stranded wire between 12AWG and 24AWG.

NOTE	Analog sensors used with the MX 40 must supply 4mA for a zero reading and 20mA for a full scale reading. The sensors current output should be linear for readings between zero and full scale. Sensors that do not meet this requirement must not be used with the MX 40.

NOTE	External devices attached to the equipment must require a tool to access their wiring terminals to prevent unauthorized access.

NOTE	Hazardous live voltages of external devices attached to the DA4 must be isolated or disconnected prior to accessing the terminals of the external devices

NOTE	All cable penetrations for analog sensor cables must be made in the bottom of the enclosure (See Figure 10). All penetrations must use a NEMA4 rated cable gland (Appleton P/N CG-2575 or equivalent) to prevent water ingress and restrict access to the internal circuits of the MX 40.

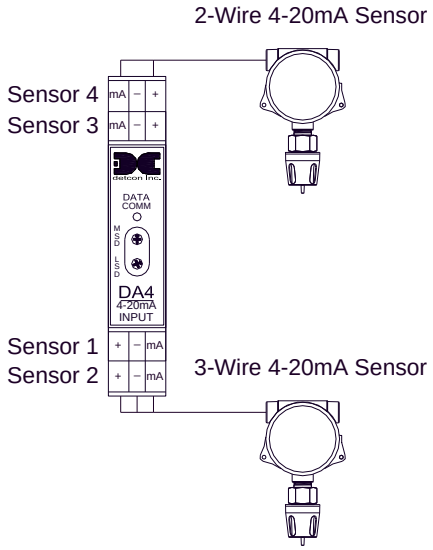

Figure 16 Model DA-4 4-20mA Input Module and 4-20mA Gas Sensor Connections

There are four 4-20mA inputs with each DA-4 module to support up to four sensors (See Figure 17). DA-4 modules can be installed on the DIN rail of the controller.

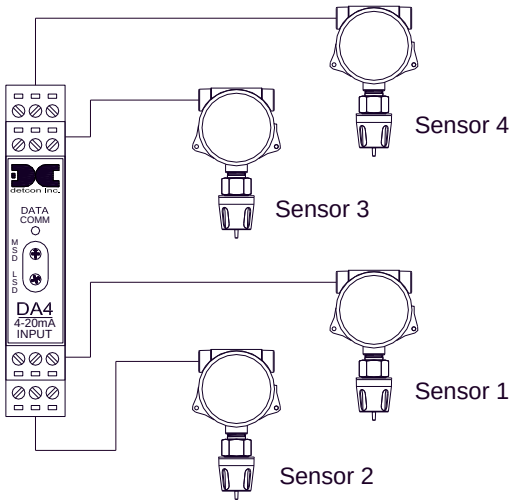

Figure 17 Model DA-4 4-20mA Input Module and 4-20mA Gas Sensors

Serially address each DA-4 module in hex using the two rotary switches on the front of the module labeled **MSD** (most significant digit) and **LSD** (least significant digit). Ensure that each DA-4 module has a unique Modbus™ address and is addressed within the range 01h-7Fh.

NOTE	DA-4 modules must be connected to the RS-485 Master Port, they must be addressed correctly within the range of 01h-7fh.

NOTE	The sensors must be powered on and outputting at least 1.8mA to be detected by the auto configure. If a sensor is in fault, its output will be 0mA and it will not be detected by the auto configure.

A DA-4 module connected properly to the controller will have a flashing DATA COMM LED to indicate a valid communication status and will provide the controller with a continuous reading of the sensor attached. All other information will need to be modified on the Channel Details screen for each channel corresponding to the appropriate DA-4 module.

3.3 Dry Contact Inputs (DI-4)

Relay contact outputs from field devices can be connected to Model DI-4 input modules. There are four relay contact inputs in each Model DI-4 module (See Figure 18). DI-4 modules can be installed on the DIN rail of the controller. DI-4 modules must be connected to the RS-485 Master Port.

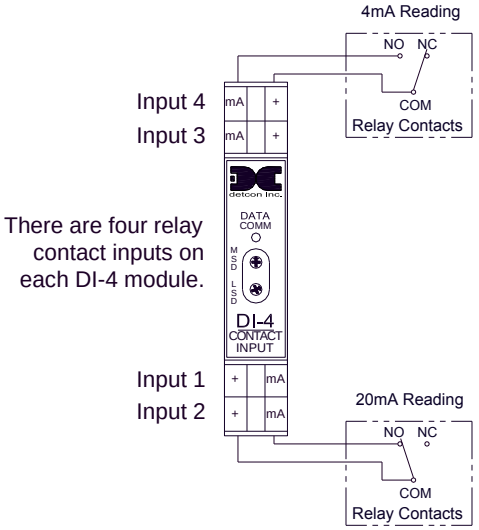

Figure 18 Model DI-4 Contact Input Module

NOTE	The terminals on the DI-4 module are rated for a maximum of 30VDC. They are designed to accept solid or stranded wire between 12AWG and 24AWG.

NOTE	External devices attached to the equipment must require a tool to access their wiring terminals to prevent unauthorized access.

NOTE	Hazardous live voltages of external devices attached to the equipment must be isolated or disconnected prior to accessing the terminals of the external devices

NOTE	The cable penetrations for the dry contact inputs must be made in the bottom of the enclosure (See Figure 10). All penetrations must use a NEMA4 rated cable gland (Appleton P/N CG-2575 or equivalent) to prevent water ingress and restrict access to the internal circuits of the MX 40.

Serially address the module in hex using the two rotary switches on the front panel labeled **MSD** (most significant digit) and **LSD** (least significant digit). Ensure that each DI-4 module has a unique Modbus™ address and is addressed within the range 01h-7Fh.

NOTE	DI-4 modules must be connected to the RS-485 Master port, they must be addressed correctly in the range of 01h-7fh.

A DI-4 module connected properly to the controller will have a flashing DATA COMM LED to indicate a valid communication status and will provide the controller with a 4mA reading when the contact from the field device is open and a 20mA reading when the contact is closed for the corresponding channels. All other information will need to be modified on the Channel Details screen for each channel corresponding to the appropriate DA-4 module.

3.4 Analog 4-20mA Outputs (AO-4)

There are four 4-20mA outputs in each Model AO-4 module (See Figure 19). These can be used as signal inputs to other control devices. AO-4 modules can be installed on the DIN rail of the controller.

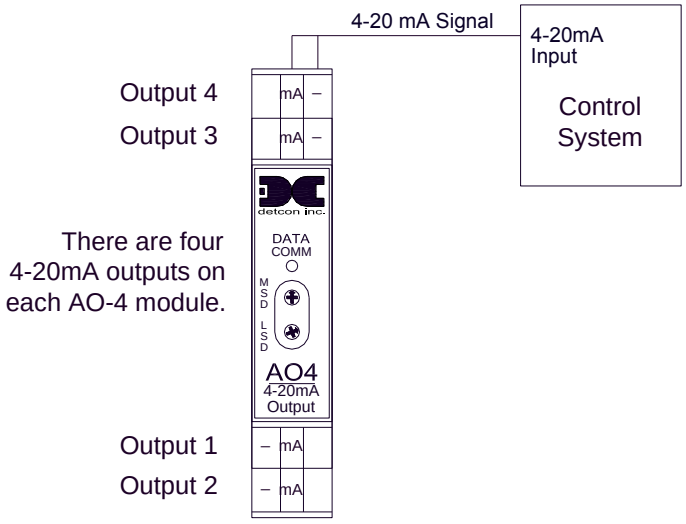

Figure 19 Model AO-4 4-20mA Output Module

NOTE	The terminals on the AO-4 module are rated for a maximum of 30VDC. They are designed to accept solid or stranded wire between 12AWG and 24AWG.

NOTE	External devices attached to the equipment must require a tool to access their wiring terminals to prevent unauthorized access.

NOTE	Hazardous live voltages of external devices attached to the AO4 must be isolated or disconnected prior to accessing the terminals of the external devices

NOTE	The cable penetration for the analog outputs must be made in the bottom of the enclosure (See Figure 10). All penetrations must use a NEMA4 rated cable gland (Appleton P/N CG-2575 or equivalent) to prevent water ingress and restrict access to the internal circuits of the MX 40.

AO-4 modules provide a 4-20mA output equal to the current concentration reading reported to the controller for the associated channel. These concentration readings are communicated by the controller to the AO-4 modules using RS-485 Modbus™ RTU protocol. Therefore, each AO-4 module must have a unique Modbus™ address. Modules are serially addressed in hex using the two rotary switches on the module's front panel labeled MSD (most significant digit) and LSD (least significant digit). AO-4 modules must be connected to the RS-485 Master Port. The AO-4 modules must be addressed according to Table 1 AO-4 Modbus™ Addresses.

Table 1 AO-4 Modbus™ Addresses

Module	Channel #	Hex	Module	Channel #	Hex
1	1 2 3 4	A1	5	17 18 19 20	A5
2	5 6 7 8	A2	6	21 22 23 24	A6
3	9 10 11 12	A3	7	25 26 27 28	A7

Module	Channel #	Hex	Module	Channel #	Hex
4	13 14 15 16	A4	8	29 30 31 32	A8

NOTE	The AO-4 modules must be connected to the RS-485 Master Port and addressed correctly in the range of A1h-A8h.

An AO-4 module connected properly to the controller will have a flashing DATA COMM LED to indicate a valid communication status and will provide a continuous output mA reading that corresponds directly to the sensor attached. If the controller does not detect an AO-4 module, the blue LED (Fault) will start flashing and COMM ERROR will be displayed on the AO-4 group page.

3.5 Alarm Relay Outputs (RL-4)

There are four (4) Form C Single Pole Double Throw (SPDT), 5 Amp relays in each Model RL-4 module. Each relay in the module is assigned specifically to one alarm. Relay 1 is assigned to Alarm 1, relay 2 is assign to Alarm 2, relay 3 is assigned to Alarm 3, and relay 4 is assigned to Fault. These can be used to control (fire) annunciating devices or as signal inputs to other control devices. Connections to the relay contacts of the RL-4 module are shown in Figure 20 and are labeled C (Common), NO (Normally Open) and NC (Normally Closed). Note that the 5 Amp rating of the relay contact should not be exceeded. RL-4 modules are installed on the DIN rail of the controller.

NOTE	There are four Form C, Single Pole Double Throw (SPDT), 5 Amp relay contacts in each RL-4 module. Each relay in the module is assigned to one alarm as follows: • Relay 1 is assigned to Alarm 1 • Relay 2 is assign to Alarm 2 • Relay 3 is assigned to Alarm 3 • Relay 4 is assigned to Fault

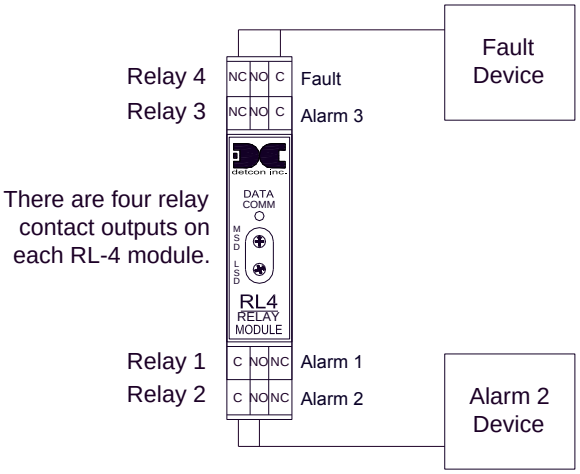

Figure 20 Model RL-4 Relay Output Module

NOTE	The current ratings of the relay contacts, 5A @ 30VDC, 5A @ 250VAC and 5Amp rating should not be exceeded. Wire attached to the RL4 terminals must be safety approved and rated for at least 5A.

NOTE	External devices attached to the RL4 outputs must require a tool to access their wiring terminals to prevent unauthorized access.

NOTE	Hazardous live voltages of external devices attached to the equipment must be isolated or disconnected prior to accessing the terminals of the external devices

NOTE	The cable penetration for the relay outputs must be made in the bottom of the enclosure (See Figure 10). All penetrations must use a NEMA4 rated cable gland (Appleton P/N CG-2575 or equivalent) to prevent water ingress and restrict access to the internal circuits of the MX 40.

Serially address the module in hex using the two rotary switches on the front panel labeled **MSD** (most significant digit) and **LSD** (least significant digit). Ensure that each RL-4 module/BM 25W/alarm station has a unique Modbus™ address. Set the addresses in accordance with Table 2.

Table 2 RL-4 Relay Modbus™ Addresses

Bank	RL-4/alarm stations addresses (hex)	BM 25W addresses (decimal)
Bank1	80-81	1-2
Bank2	82-83	3-4
Bank3	84-85	5-6
Bank4	86-87	7-8
Bank5	88-89	9-10
Bank6	8A-8B	11-12
Bank7	8C-8D	13-14
Bank8	8E-8F	15-16

If the N4X unit is ordered with an integral alarm strobe, it will be connected to the **Alarm 1** connector of the first RL-4 installed in the enclosure. The RL-4 is configured to Bank1, Alarm1, but can be reconfigured by the user (refer to Section 5.2.4).

NOTE	The MX 40 controller is configured with a maximum of eight separate relay banks each holding up to two RL-4 modules. The RL-4 modules must be connected to the RS-485 Master Port, and must be addressed correctly in the range of 80h-8Fh. Each BM 25W counts as a RL-4/Alarm station. The MX 40 controller will automatically add 79 to the BM 25W slave address number. Therefore BM 25W with address #2 will be automatically considered as alarm station with address #81 and will be assigned to Bank 1.

A RL-4 module connected properly to the controller will have a flashing DATA COMM LED to indicate a valid communication status and will provide the controller with 4 user assignable relay outputs that can be used to drive external annunciator devices. If the controller does not detect a configured and assigned RL-4 module, the blue LED (Fault) will start flashing and a comm error will be displayed on the RL-4 group page.

3.6 RS-485 Serial Gas Sensors

RS-485 Serial Sensors will communicate directly with the MX 40 via Modbus™. Connect the five wires of the Modbus™ capable sensor to the Modbus™ DIN rail mounted terminal blocks labeled **RS-485 MASTER** and **VDC Out** (Figure 21).

NOTE	The only Modbus™ capable Oldham sensors that may be used with the MX 40 are Model OLCT 700 series.

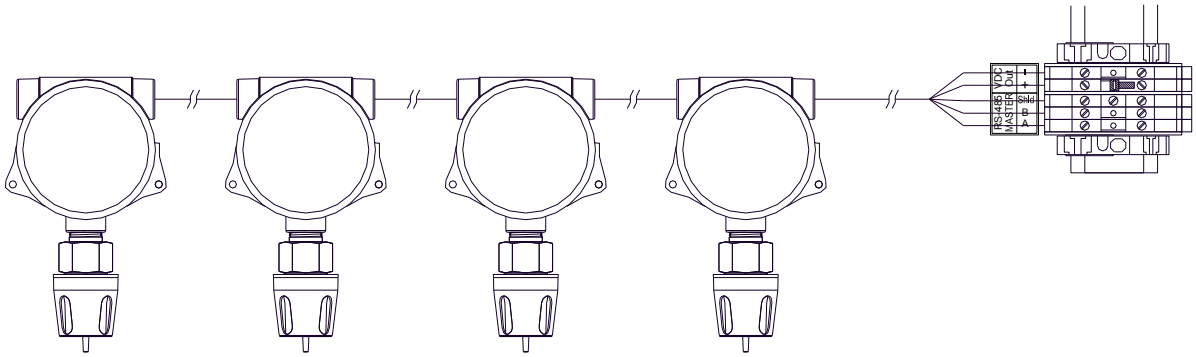

Figure 21 Modbus™ Gas Sensor Connections

NOTE	Each sensor and DIN rail module must have a unique Modbus™ address. No two devices on the Modbus™ network can have the same address.

Ensure that each serial sensor is assigned a unique Modbus™ address and within the range 01h-7Fh. Connect the sensors in a daisy-chained series to the other RS-485 sensors.

NOTE	A serial sensor connected properly to the controller will provide the controller with a continuous reading of the sensor attached. Serial sensors must be connected in series to the RS-485 Master port and must be addressed correctly.

3.7 Wireless BM 25W standalone gas monitors

Oldham offers a wide range of wireless sensors and field devices for use with the MX 40 wireless option if selected. Devices such as alarm stations, remote displays and various sensor types including BM 25W wireless standalone gas monitors are available and able to communicate wirelessly using transceivers that operate at 2.4GHz and conform to non-licensed radio frequency appliance usage around the world. Refer to the BM 25 manual for more detailed information.

For proper communication, wireless devices must have a unique Modbus™ address and must reside on the same RF channel/Network ID as the wireless transceiver of the MX 40 Master Ports Transceiver. The assigned Modbus address for the serial sensor does not necessarily correspond to the channel number in the controller. The Modbus address assigned for wireless sensors does not necessarily determine the channel number the controller will assign it to (Modbus™ addresses are hexadecimal. Channels numbers are decimal. A conversion chart can be found in Section 11.2 Hexadecimal Table.). The controller will acknowledge Wireless sensors addressed between 01h and 7Fh. The controller will acknowledge Wireless BM 25 addressed between 01d and 16d. The controller will acknowledge alarm stations with addresses of 80h through 8Fh.

NOTE: Each wireless device in the network must have a unique Modbus address. All wireless devices in the network must reside on the same RF channel/Network ID.

3.8 General Installation Wiring Notes

- Follow generally accepted guidelines for RS-485 serial networks. Do not wire I/O Modules and/or Modbus™ gas sensors in long-distance 'T-Tap' configurations. Instead, use a "daisy-chain" wiring scheme.
- Use Oldham Recommended cabling whenever possible.
  - General Cable Commodore P/N ZO16P0022189 is recommended for a single cable providing serial communications and power.
- Ground the cable shielding at the Model MCX-32 controller ***only***. Other points of grounding may cause a ground loop, and induce unwanted noise on the RS-485 line, which in turn may disrupt communications.
- For wireless installations, verify that all devices in the wireless network reside on the same RF channel as transceivers will only respond to other transceivers with the same RF channel.
- If multiple wireless networks are implemented, each wireless network must exist on a separate RF channel in order to avoid cross talk and interference between networks.
- Any slave device near an elevated antenna needs to be at least as far from the antenna as the antenna is high. For example, if the antenna is 20ft. high, then the nearest slave device should be at least 20 ft. away.

3.9 Initial Start-Up

CAUTION

Applying power with devices hooked up incorrectly may cause damage to the equipment.

1. Verify that all the wiring connections and external devices are installed correctly before applying power to the controller.

2. Verify that all Modbus™ devices have unique Modbus™ address, and are addressed correctly.

3. Apply the desired power option to the MX 40. Ensure that the Disconnect Terminal Blocks are closed. The controller will power up once power is applied.

4. Verify normal operation once power is applied to the unit. The unit will cycle through the following:
   - Boot up and display the company name, model, firmware version and COMM ports available.
   - Proceed to poll Modbus™ addresses of any attached devices.
   - The LCD will then refresh and display the next eight channels and so on until the LCD cycles back to the first eight channels and repeats the process.

NOTE: If a previous configuration does not exist, the user must either manually configure the network or run Auto Configure from the user-interface. The unit will display the current status of the connected devices if the unit has been configured properly.

5. Apply test gas to each sensor connected to the MX 40. Verify that the correct alarm outputs are activated when gas is applied. If AO-4 modules are installed, the current output for each channel should also be verified.

4.0 Secure Digital Card

NOTE	Ensure that power is turned off to the MX 40 before installing or removing the SD card.

1. Install the SD card in the SD slot (J9) on the back of the controller's PCA before the controller is powered up.
2. The controller will notify the user if a successful installation of the card was achieved upon power up.
3. The controller will automatically format the card and create the necessary files for data logging. Refer to Section 5.2.8 for more information regarding the data logging feature.

NOTE	Data logging does not occur during the first 10 minutes after power-up of the unit. This delay allows the sensors time to stabilize, so that inaccurate or faulty readings will not be logged during this stabilization period.

5.0 System Configuration

5.1 MX 40 Controller Setup

1. The PROG switch is used to enter the menu mode of the unit by swiping a programming magnet over the corresponding marker (⊗). Upon entering the menus, all Modbus™ polling stops, sensor values are not read and alarm outputs are not updated.

NOTE	If the MX 40 is in alarm when the user enters the menu, it will stay in alarm until they exit the menu.

2. Upon entering the MAIN MENU, the LCD will display the following:

MAIN MENU

AUTO CONFIGURE SYSTEM

3. Use the down arrow "↓" switch to move to the next menu item or use the up arrow "↑" switch to move to the previous menu item by swiping the programming magnet over the corresponding markers. Swiping the **PROG** switch again will return the unit to normal operation.

4. Swipe the **ENTER** marker when the appropriate menu item is located to enter the menu.

5.2 Menu Functions

The Main Menu and consists of seven menu items:

1. Auto Configure System
2. Setup Channel Data
3. Set Channel Alarms
4. Set Relay Function
5. Inhibit & Alarm Test Mode
6. System Diagnostics
7. Time and Date
8. View TWA & Peak

5.2.1 Auto Configure System

1. Ensure that the addresses on all modules and sensors are correctly set (Section 3.0).

2. Verify that all 4-20mA inputs are turned on. (**Note:** Only currents above 1.8mA will be detected.)

3. Upon entering Auto Configure menu, the LCD will display:

CONFIGURATION SUMMARY
CHANNELS:## BM25:## AO4S:## WIRELESS TRANSCEIVER WTS:##
RL4/ALARM STATION COUNT:##
[RUN SYSTEM AUTO CONFIGURE]

4. Swipe the ENTER marker to initiate the search. The MX 40 controller will perform an incremental search for available wireless BM 25W standalone gas monitors, 700 serial sensors starting with Modbus™ address 01h and analog inputs with a minimum current of 1.80mA.

NOTE	All sensors and modules must be powered on to be detected correctly.

NOTE	The channel tags for the analog inputs will be set to "PPM H2S" by default. These can be changed in the Utilities menu.

NOTE	The channel tags for detected serial sensors will be set to gas type and units of the sensor detected by default. These can be changed through the Utilities menu.

NOTE	A swipe of the PROG marker while in search mode will abort the search and restore the previous configuration. Any devices found up to that point will not be saved.

5. The search will continue until Modbus™ address 7Fh is reached or the search is terminated by swiping the 'ENTER' marker which will save the current found configuration. When all of the connected sensors are identified, swipe 'ENTER' to begin detecting RL4 modules beginning with Modbus™ address 80h.

NOTE	Once all of the attached sensors are identified, swipe the ENTER marker to move on to the next stage (RL4 search). Each address that is not responding will take an additional two seconds to time out.

6. The search will continue until Modbus™ address 8Fh is reached or the search is terminated by swiping the 'ENTER' marker which will save the RL4 modules. When all of the connected RL4s are identified, swipe 'ENTER' to begin detecting AO-4s with Modbus™ address A1h.

7. The search will continue until Modbus™ address A8h is reached or the search is terminated by swiping the ENTER marker which will save the AO-4 modules. When all of the connected AO-4s are identified, swipe 'ENTER' to begin detecting wireless radio modules starting with Modbus™ address 01h.

8. The search will continue until Modbus™ address 7Fh is reached or the search is terminated by swiping the ENTER marker which will save the wireless radio modules found.

NOTE	A swipe of the PROG marker while in search mode will abort the search and restore the previous configuration. Any devices found up to that point will not be saved.

5.2.2 Setup Channel Data

1. Upon entering this menu, the LCD will display:

CHANNEL 1 DATA:	**DECIMAL POINT:**
SLAVE ID:	**RANGE:**
DEVICE TYPE:	**TYPE:**
ANALOG INPUT:	**RL4 BANK CNT:**

2. A flashing cursor will appear on SLAVE ID. Swiping the magnet over:
   - The markers of the up or down arrows will move the flashing cursor to the desired function.
   - The ENTER marker will select the function indicated by the flashing cursor
   - The markers of the up or down arrows will change the value.
   - The ENTER marker will save the selected value and return to the flashing cursor.

3. If there is more than one channel, a swipe of the down arrow marker while the flashing cursor is on RL4 BANK CNT will scroll the display to the next channel allowing for its configuration. To return to the previous channel, a swipe of the up arrow marker should be performed while the flashing cursor is on SLAVE ID.

4. SLAVE ID is detected during the MX 40 auto-configuration process and cannot be changed by the user.

5. DEVICE TYPE is detected during the MX 40 auto-configuration process and cannot be changed by the user.

6. If the device type is "DA4", then ANALOG INPUT indicates the DA4 input associated with the channel. If the device type is something other than "DA4", this field will read "—".

7. DECIMAL POINT indicates the number of places in the gas reading to the right of the decimal point. This value cannot be changed by the user.

8. RANGE is the range of the sensor attached to the channel. If the device type is "DA4", this value can be changed by the user. If the device type is something other than "DA4", this value is detected during auto-configuration and cannot be changed by the user.

9. TYPE is the user entered name for the channel. It can be up to 9 characters long.

10. The RL4 banks assigned to the channel can be set using RL4 BANK CNT. Swiping ENTER on this field will show the RL4 banks assigned to this channel. If a number is displayed, then the bank is assigned to the channel. If "-" is displayed, then the bank is not assigned to the channel. The user can move between RL4 banks using down arrow marker. Swiping the up arrow marker on a bank will allow the user to toggle the bank on and off. Swiping ENTER marker will save the values and return to the Setup Channel Data menu.

5.2.3 Set Channel Alarms

The Set Channel Alarms menu allows configuration of each channel's alarms. The information to be configured is the;

- ALM1 LEVEL,
- ALM1 ASCENDING,
- ALM2 LEVEL,
- ALM2 ASCENDING,

- ALM3 LEVEL, and
- ALM3 ASCENDING.

1. Upon entering this menu, the LCD will display:

CHANNEL 1 ALARMS:	**ALM2 LEVEL: ##**
	ALM2 ASCENDING: X
ALM1 LEVEL: ##	**ALM3 LEVEL: ##**
ALM1 ASCENDING: X	**ALM3 ASCENDING: X**

2. A flashing cursor will appear on ALM1 LEVEL. Swiping the magnet over:
   - The markers of the up or down arrows will move the flashing cursor to the desired function.
   - The ENTER marker will select the function indicated by the flashing cursor
   - The markers of the up or down arrows will change the value.
   - The ENTER marker will save the selected value and return to the flashing cursor.

3. If there is more than one channel, a swipe of the down arrow marker while the flashing cursor is on ALM3 ASCENDING will scroll the display to the next channel allowing for its configuration. To return to the previous channel, a swipe of the up arrow marker should be performed while the flashing cursor is on ALM1 LEVEL.

4. Ensure that the gas alarm relay (if not being used) has a setting of 0 to make it inactive.

NOTE	Any channels that are in alarm or fault will not display the device tag on the main display.

NOTE	If the channel range is changed, then the alarm set points must be re-entered.

5.2.4 Set Relay (Alarm) Functions

1. Upon entering this menu, the LCD will display:

FAULT RELAY SETUP: BANK 1
LATCHING: X
ENERGIZED: X
SILENCEABLE: X

NOTE	Relays are displayed in the following order: • FAULT • ALARM1 • ALARM2 • ALARM3

2. A flashing cursor will appear on LATCHING for Bank1. Swiping the magnet over:
   - The markers of the up or down arrows will move the flashing cursor to the desired function.
   - The ENTER marker will select the function indicated by the flashing cursor.
   - The markers of the up or down arrows will change the value.
   - The ENTER marker will save the selected value and return to the flashing cursor.
   - The down arrow marker while the flashing cursor is on SILENCEABLE for Bank1 will scroll the display to the next relay allowing for its configuration.
   - The up arrow marker to return to the previous relay while the flashing cursor is on LATCHING for Bank1.

NOTE	By default, each sensor found during the auto configuration will be assigned to all eight relay banks. This setting can be changed through the utilities menu.

3. Repeat Step 2 for the remaining banks containing three alarms and a fault.

4. Ensure that all four relay outputs in all eight banks are set-up to account for the following three settings (Section 1.7). The values selected can be either Y (Yes) or N (No).
   - Latching or Non-Latching
   - Energized or De-Energized
   - Silenceable or Non-Silenceable

NOTE	It is generally recommended to set the FAULT relay as energized so that it will trip upon loss of power.

NOTE	The FAULT condition is assigned to the FAULT relay as a standard. It cannot be disengaged in the configuration of the controller. The Main Display will show IN FAULT for any channel that is in fault.

5.2.5 Inhibit and Alarm Test Mode

Inhibit mode permits testing of sensors while preventing alarms from being activated. Alarm test mode permits testing of the attached alarm devices without applying gas to the sensors

1. Upon entering this menu, the LCD will display:

INHIBIT & ALARM TEST MODE

INHIBIT MODE:	**ALARM TEST MODE:**
#:##	
START	**OFF**

2. These values can be changed by swiping the magnet over the markers of the up or down arrows to move the arrow prompt "→" to the desired function. A swipe over:
   - The ENTER marker will select the function indicated by the arrow prompt "→".
   - The markers of the up or down arrows will change the value.
   - The ENTER marker will save the selected value.

3. Activate inhibit mode by entering the timer value in minutes and seconds (0-60 minutes).

4. Select **START** and all relay outputs on the network will be disabled until the timer reaches 0 or is manually stopped by the user by turning off the inhibit mode.

5. Activate alarm test mode to verify that connected alarm devices are functioning properly by swiping the magnet over the markers. All channels will simultaneous go from 0 to full scale in 5% increments. When they reach full scale they will return to 0 in 5% increments. This will continue indefinitely until alarm test mode is turned off.

6. Verify that the relays fire according to their configuration as the readings cross their respective alarm set points.

5.2.6 System Diagnostics

The System Diagnostics menu performs function tests for the following:

- LCD display,
- Panel LED's,
- External reset switch,
- Relays, and
- Modbus™ interface.

Upon entering this menu, the MX 40 controller will automatically initiate a function test that displays every pixel LCD display. The controller then performs a function test of the LED drivers by activating all four LED's. After the LED test, the controller initiates a test for the external reset switch which lets the user know when the reset switch is pressed.

The user will be prompted:

1. To "press (swipe) enter key (marker) to continue" which will initiate the relay driver test and the controller will then reset all the relays and turn on the alarm 1 relay.

2. To "press (swipe) any key (marker)" which will turn on the alarm 2 relay.

3. To "press any key" and the alarm 3 relay will be turned on.

4. To "press any key" and the fault relay will be turned on.

5. To "press any key" and all the relays will be reset.

6. Connect COMM1 (master) to COMM2 (slave) for a Modbus™ loop back test at different baud rates and “press any key” to continue or swipe any marker to stop the test.

NOTE	When performing the Modbus™ loop back test, the loop back cable should be installed between the **COMM1** (Master) port and the **COMM2** (Slave) port. Disconnect all other external Modbus™ interfaces from the loop and bypass any installed modules.

5.2.7 Time and Date

1. Upon entering this menu, the LCD will display:

TIME AND DATE:
##:##:## | **##:##:##**
|
[TIME] **[DATE]**

2. Verify that **[TIME]** is selected and swipe the magnet over the ENTER marker to enter the SET TIME menu.

3. Swipe the magnet over the markers of the up or down arrows to move the arrow prompt "→"to the desired field.

4. A swipe over the ENTER marker will select the field indicated by the arrow prompt "→" and the value can be changed by swiping over the markers of the up or down arrows.

5. Another swipe over the ENTER marker will save the selected value.

6. Once the desired values have been set, move the arrow prompt to "Update Time" and swipe the ENTER marker to update the time with the changes entered.

7. Swipe the magnet over the marker of the down arrow and verify **[DATE]** is selected.

8. Swipe the magnet over the ENTER marker to enter the SET DATE menu.

9. Swipe the magnet over the markers of the up or down arrows to move the arrow prompt to the desired field.

10. A swipe over the ENTER marker will select the field indicated by the arrow prompt and the value can be changed by swiping over the markers of the up or down arrows.

11. Another swipe over the ENTER marker will save the selected value.

12. Once the desired values have been set, move the arrow prompt to "Change Date" and swipe the ENTER marker to update the date with the changes entered.

13. A swipe of the PROG marker at any time while setting the time or date will escape out of the current menu with no changes saved.

5.2.8 View TWA and Peak

1. Verify that a secure digital (SD) memory card is installed in the SD slot of the MX 40 controller board (J9).

2. Upon entering this menu, the user can view the data recorded from the SD card and is displayed as:

<File Name>:
MM/DD/YY, HH:MM:SS, Channel #, TWA #, PEAK #

Example:
TWA_P08.CSV:
05/17/11,23:00:09,17, 51, 100

The sensor readings are continuously logged to the SD card. This data can also be viewed by removing the SD card and inserting it in a laptop using the Oldham Log File Viewer application. Refer to the Oldham Log File Viewer instruction manual for detailed information.

6.0 Modbus™ Slave Communications Port

A Modbus™ RTU master can poll the slave port on the MX 40 allowing the Modbus master to remotely monitor the status of the MX 40. If multiple MX 40s are being used on a single Modbus™ network, each controller must be set to a different device address.

6.1 Modbus™ Register Map

Table 3 MX 40 Register Map

Channel #	Register	Description	Channel #	Register	Description
Channel 1	40000	Reading	Channel 17	40032	Reading
	40001	Status		40033	Status
Channel 2	40002	Reading	Channel 18	40034	Reading
	40003	Status		40035	Status
Channel 3	40004	Reading	Channel 19	40036	Reading
	40005	Status		40037	Status
Channel 4	40006	Reading	Channel 20	40038	Reading
	40007	Status		40039	Status
Channel 5	40008	Reading	Channel 21	40040	Reading
	40009	Status		40041	Status
Channel 6	40010	Reading	Channel 22	40042	Reading
	40011	Status		40043	Status
Channel 7	40012	Reading	Channel 23	40044	Reading
	40013	Status		40045	Status
Channel 8	40014	Reading	Channel 24	40046	Reading
	40015	Status		40047	Status
Channel 9	40016	Reading	Channel 25	40048	Reading
	40017	Status		40049	Status
Channel 10	40018	Reading	Channel 26	40050	Reading
	40019	Status		40051	Status
Channel 11	40020	Reading	Channel 27	40052	Reading
	40021	Status		40053	Status
Channel 12	40022	Reading	Channel 28	40054	Reading
	40023	Status		40055	Status
Channel 13	40024	Reading	Channel 29	40056	Reading
	40025	Status		40057	Status
Channel 14	40026	Reading	Channel 30	40058	Reading
	40027	Status		40059	Status
Channel 15	40028	Reading	Channel 31	40060	Reading
	40029	Status		40061	Status
Channel 16	40030	Reading	Channel 32	40062	Reading
	40031	Status		40063	Status

Reading Register

Current gas reading of the channel assigned to the register.

Status Register

Bit 0	Alarm 1	0 = No Alarm	1 = In alarm 1
Bit 1	Alarm 2	0 = No Alarm	1 = In alarm 2
Bit 2	Alarm 3	0 = No Alarm	1 = In alarm 3
Bit 3	Fault	0 = No Fault	1 = Sensor/Alarm Fault
Bit 4[1]	Cal	0 = Normal Operation	1 = In Cal
Bit 5	Comm Error	0 = Normal Operation	1 = Communication Error
Bit 6 & Bit7[1]	Decimal Point	00 = No Decimal Point(No Divisor)	10 = 2 Decimal Point (Divisor of 100)
		01 = 1 Decimal Point (Divisor of 10)	11 = Undefined (Default to No Decimal Point)
Bit 8	Smart Battery Pack	0 = No Smart Battery Pack	1 = Smart Battery Pack
Bit 9	Battery Error	0 = No Battery Error	1 = Battery Error
Bit 10	Low Battery	0 = No Low Battery	1 = Low Battery
Bit 11	Not Used		
Bit 12	Wireless Network Type	0 = 320	1 = 300
Bits 13-15	Type	000 = Channel Disabled	100 = Repeater[5]
		001 = CXT Sensor	101 = Sensor
		010 = Alarm Station	110 = Undefined (Sensor)
		011 = SmartHMI[5]	111 = Undefined (Sensor)

[1] These bits are only active for sensor devices

7.0 Remote Alarm Reset/Acknowledge Switch Installation

1. Mount the reset switch on the bottom or side of the NEMA 4X enclosure. For the other enclosure types, the switch must be mounted externally such as in the bottom of a J-Box.

2. Standard Momentary Pushbutton Switch

    a. The standard reset switch should be a Normally Open, Momentary Closed switch that is rated for the area of installation.
    b. Connect the Remote Alarm Reset/Acknowledge switch to the terminals of the terminal block labeled "REMOTE RESET" for the N1P and N4X controllers (Figure 22). For the N7 controller, connect the switch to the terminals "SW" on connector J7 (Figure 23) Once installed, pushing the switch will execute the reset/acknowledge function.

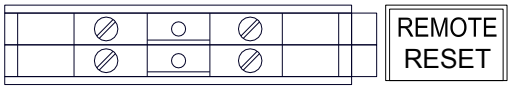

Figure 22 N1P & N4X Remote Switch Input

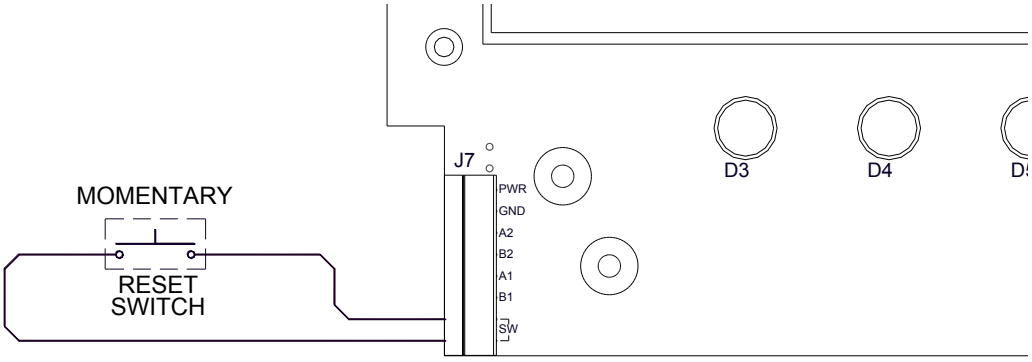

Figure 23 N7 Remote Switch Input

3. Oldham Class I Division I Switch

    a. Connect the red wire to the PWR or +24V terminal
    b. Connect the black wire to the GND or – terminal
    c. Connect the purple wire to the SW connection nearest the B1 terminal (Figure 24)

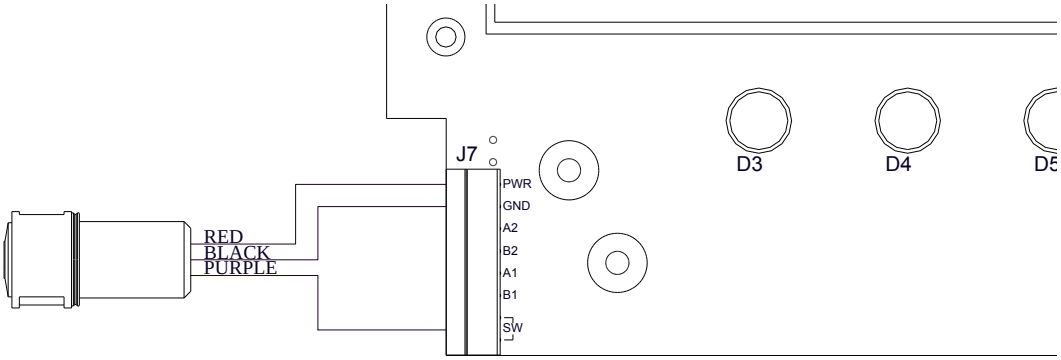

Figure 24 Oldham C1D1 Switch Connections

8.0 Troubleshooting Guide

Unit will not power up
Verify correct AC or DC voltage selection.
Verify correct VAC and VDC powering configuration.

Relays are not firing
Verify that the alarm relays are configured properly.

Alarms on constantly
Ensure that no channels are set to ascending or descending incorrectly.

Alarm Firing causes unit to "Lock Up"
Verify that the alarm annunciator current draw does not exceed the on-board power supply limits. Replace with external power supply if necessary.

Contact the Oldham Service Department for further troubleshooting assistance at +1-713-559-9200 in USA or +33-321-608-086 in France.

8.1 Replacement of the NEMA 4 Drop-In Display Assembly

The NEMA4 enclosures come with a 'Drop-In' Display Assembly (P/N MX40-949-005142-200)

1. Unplug the connector from J7 on the Display Assembly.
1. Remove the 10 Hex-Head bolts holding the Display Assembly to the cover of the enclosure
2. Replace the Drop-In Display Assembly on the enclosure cover, and replace the 10 Hex-Head Bolts.
3. Ensure that gasket is placed between the Drop-In Display Assembly and the cover.
4. Tighten the bolts to secure the Drop-In Display Assembly in place.
5. Reconnect the connector to J7 on the display.
6. Check the wiring going to the Drop-In Assembly. The correct wiring is shown in figure below.
   Note: some older units may have different wiring, and it is important to ensure the wiring is correct.

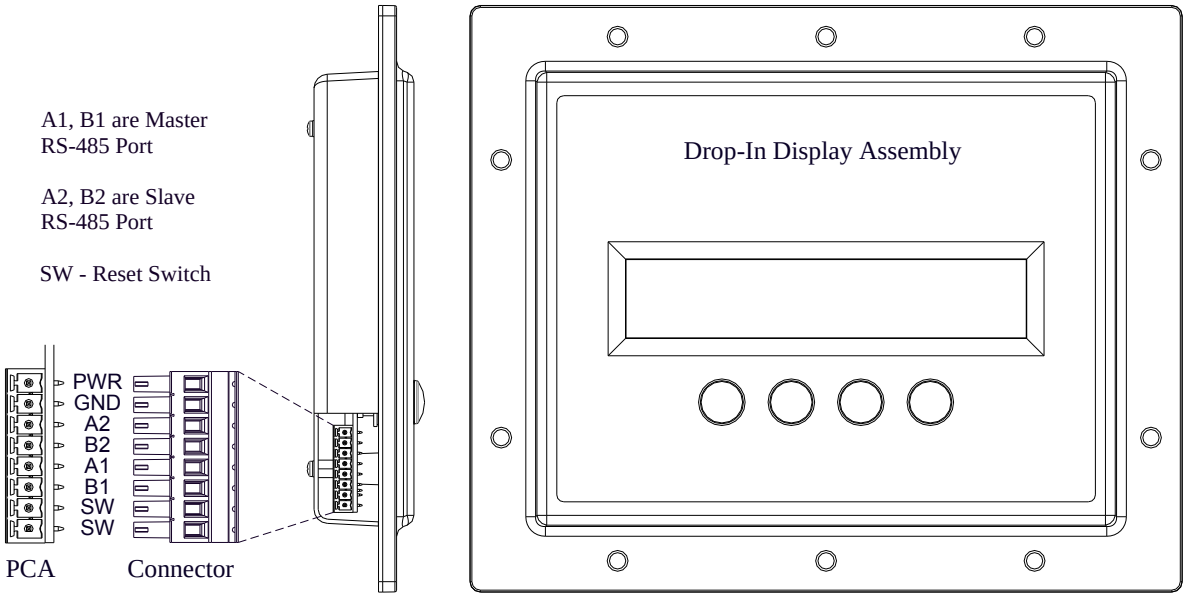

Figure 25 NEMA 4 Drop-In Display Assembly

9.0 Customer Support and Service Policy

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All Technical Service and Repair activities should be handled by the Oldham Service Department via phone, fax or email (contact information given above). RMA numbers should be obtained from the Oldham Service Department prior to equipment being returned. For on-line technical service, customers should have the model number, part number, and serial number of product(s) in question available.

All Sales activities (including spare parts purchase) should be handled by the Oldham Sales Department via phone, fax or email (contact information given above).

NOTE	All additional parts must be supplied by Oldham. Use of parts from a third party will void warranty and safety approvals.

NOTE	MX 40 should only be repaired by Oldham personnel or an Oldham trained representative.

10.0 Warranty Notice

Oldham S.A.S. warrants the MX 40 Integrated Alarm and Control System to be free from defects in workmanship of material under normal use and service for two years from the date of shipment on the transceiver electronics.

Oldham S.A.S. will repair or replace without charge any such equipment found to be defective during the warranty period. Full determination of the nature of, and responsibility for, defective or damaged equipment will be made by Oldham S.A.S. personnel.

Defective or damaged equipment must be shipped to the Oldham S.A.S. factory or representative from which the original shipment was made. In all cases, this warranty is limited to the cost of the equipment supplied by Oldham S.A.S.. The customer will assume all liability for the misuse of this equipment by its employees or other contracted personnel.

All warranties are contingent upon the proper use in the application for which the product was intended and does not cover products which have been modified or repaired without Oldham S.A.S. approval, or which have been subjected to neglect, accident, improper installation or application, or on which the original identification marks have been removed or altered.

Except for the express warranty stated above, Oldham S.A.S. disclaims all warranties with regard to the products sold. Including all implied warranties of merchantability and fitness and the express warranties stated herein are in lieu of all obligations or liabilities on the part of Oldham S.A.S.. for damages including, but not limited to, consequential damages arising out of, or in connection with, the performance of the product.

Oldham S.A.S. reserves the right to refund the original purchase price in lieu of ITM replacement.

11.0 Appendix

11.1 Specifications

System Specifications

Capacity:	32 I/O Channels
Sensor Inputs:	Analog 4-20mA or RS-485 Modbus™ RTU
Outputs:	Analog 4-20mA or RS-485 Modbus™ RTU
Warranty:	One year

Environmental Specifications

Operating Temperature:	-10ºC to +64ºC
Storage Temperature:	-40ºC to +85ºC
Humidity:	0-99%RH, non-condensing
Altitude:	0 -2000m

Electrical Specifications

Input Voltage:	100-120/220-240VAC, 50-60Hz 11.5-30VDC
Max AC Current Rating:	2.1A/1A (110-120VAC/220-240VAC)
Max DC Current Rating:	7.5A
Power Consumption:	MX40-08-N4X - Total Power consumption is dependent on number of I/O modules, number of gas sensors, and the type of gas sensors. Total power of controller with I/O modules and gas sensors not to exceed 100 Watts.
Power Consumption:	MX40-32-N4X - Total Power consumption is dependent on number of I/O modules, number of gas sensors, and the type of gas sensors. Total power of controller with I/O modules and gas sensors not to exceed 100 Watts.
RFI/EMI Protection:	Complies with EN61326
Electrical Classification:	NEMA 4X/ IP54 (MX40-08-N4X, MX40-32-N4X)

Mechanical Specifications

Display:	$1^1/_4$" x 6" Backlit LCD
Dimensions:	MX40-08-N4X – 11.85" W x 13.75" H x 6.5" D MX40-32-N4X – 16" W x 17.85" H x 8.5" D

Wireless Specifications

Frequency:	ISM 2.4GHz
Range:	Indoor/No Line of Sight – 1,000ft Outdoor RF Line of Sight (with directional antenna) – 1,5 miles
Spread Spectrum:	Digital-Sequence Spread Spectrum (DSSS)
Modulation:	0-QPSK
Sensitivity:	-102dBm (1% PER)

11.2 Hexadecimal Table

Table 4 Hexadecimal Conversion Table

ID#	MSD	LSD	ID#	MSD	LSD	ID#	MSD	LSD	ID#	MSD	LSD	ID#	MSD	LSD	ID#	MSD	LSD
0	0	0	43	2	B	86	5	6	129	8	1	172	A	C	215	D	7
1	0	1	44	2	C	87	5	7	130	8	2	173	A	D	216	D	8
2	0	2	45	2	D	88	5	8	131	8	3	174	A	E	217	D	9
3	0	3	46	2	E	89	5	9	132	8	4	175	A	F	218	D	A
4	0	4	47	2	F	90	5	A	133	8	5	176	B	0	219	D	B
5	0	5	48	3	0	91	5	B	134	8	6	177	B	1	220	D	C
6	0	6	49	3	1	92	5	C	135	8	7	178	B	2	221	D	D
7	0	7	50	3	2	93	5	D	136	8	8	179	B	3	222	D	E
8	0	8	51	3	3	94	5	E	137	8	9	180	B	4	223	E	F
9	0	9	52	3	4	95	5	F	138	8	A	181	B	5	224	E	0
10	0	A	53	3	5	96	6	0	139	8	B	182	B	6	225	E	1
11	0	B	54	3	6	97	6	1	140	8	C	183	B	7	226	E	2
12	0	C	55	3	7	98	6	2	141	8	D	184	B	8	227	E	3
13	0	D	56	3	8	99	6	3	142	8	E	185	B	9	228	E	4
14	0	E	57	3	9	100	6	4	143	8	F	186	B	A	229	E	5
15	0	F	58	3	A	101	6	5	144	9	0	187	B	B	230	E	6
16	1	0	59	3	B	102	6	6	145	9	1	188	B	C	231	E	7
17	1	1	60	3	C	103	6	7	146	9	2	189	B	D	232	E	8
18	1	2	61	3	D	104	6	8	147	9	3	190	B	E	233	E	9
19	1	3	62	3	E	105	6	9	148	9	4	191	B	F	234	E	A
20	1	4	63	3	F	106	6	A	149	9	5	192	C	0	235	E	B
21	1	5	64	4	0	107	6	B	150	9	6	193	C	1	236	E	C
22	1	6	65	4	1	108	6	C	151	9	7	194	C	2	237	E	D
23	1	7	66	4	2	109	6	D	152	9	8	195	C	3	238	E	E
24	1	8	67	4	3	110	6	E	153	9	9	196	C	4	239	F	F
25	1	9	68	4	4	111	6	F	154	9	A	197	C	5	240	F	0
26	1	A	69	4	5	112	7	0	155	9	B	198	C	6	241	F	1
27	1	B	70	4	6	113	7	1	156	9	C	199	C	7	242	F	2
28	1	C	71	4	7	114	7	2	157	9	D	200	C	8	243	F	3
29	1	D	72	4	8	115	7	3	158	9	E	201	C	9	244	F	4
30	1	E	73	4	9	116	7	4	159	9	F	202	C	A	245	F	5
31	1	F	74	4	A	117	7	5	160	A	0	203	C	B	246	F	6
32	2	0	75	4	B	118	7	6	161	A	1	204	C	C	247	F	7
33	2	1	76	4	C	119	7	7	162	A	2	205	C	D	248	F	8
34	2	2	77	4	D	120	7	8	163	A	3	206	C	E	249	F	9
35	2	3	78	4	E	121	7	9	164	A	4	207	C	F	250	F	A
36	2	4	79	4	F	122	7	A	165	A	5	208	D	0	251	F	B
37	2	5	80	5	0	123	7	B	166	A	6	209	D	1	252	F	C
38	2	6	81	5	1	124	7	C	167	A	7	210	D	2	253	F	D
39	2	7	82	5	2	125	7	D	168	A	8	211	D	3	254	F	E
40	2	8	83	5	3	126	7	E	169	A	9	212	D	4	255	F	F
41	2	9	84	5	4	127	7	F	170	A	A	213	D	5			
42	2	A	85	5	5	128	8	0	171	A	B	214	D	6			

11.3 Utilities

CAUTION	Contact an Oldham representative prior to changing any settings in this section. Default settings are functional for the majority of applications. Any adjustments made to other items may cause the controller or various components to not work properly.

MX 40 controller setup is accomplished through the Main Menu and consists of 9 menu items:

1. Setup Channel Data
2. Set RF Silence and RF Sleep
3. Set Low Battery Alarms
4. Set Modbus Address
5. CXT Low Battery Threshold
6. Module update rates
7. Set COMM Baud Rates
8. Set Modbus™ Timeouts
9. Display Settings

NOTE	To access the Utilities Menu, advance to the View TWA and Peak menu. Hold the magnet over the ENTER marker for 20 seconds without removing it.

11.3.1 Set Channel Data

The Setup Channel Data menu configures each channel represented by its assigned sensor or device. When a sensor or device is added to the controller, the information can be added and/or modified in this menu.

Information to be configured is as follows:

1. Slave ID
2. Device Type
3. Analog Input
4. Decimal Point
5. Range
6. Type
7. RL4 Bank

1. Upon entering this menu, the LCD will display:

CHANNEL 1 DATA:	**DECIMAL POINT:#**
SLAVE ID:##	**RANGE:#####**
DEVICE TYPE:XXX	**TYPE:XXXXXXXXX**
ANALOG INPUT:#	**RL4 BANK:XXX**

2. A flashing cursor will appear on SLAVE ID. Swipe the magnet over the markers of the up or down arrows to move the flashing cursor to the desired function. A swipe over:
   - The ENTER marker will select the function indicated by the flashing cursor.
   - The markers of the up or down arrows will change the value.
   - The ENTER marker will save the selected value and return to the flashing cursor.

NOTE	The SLAVE ID is the Modbus™ address in hex of the sensor or device being assigned to a specific channel. This will be a Modbus™ slave device to the MX 40 controller.

Device Type Value
The Device Type values available are 700 (Oldham serial sensor models), BM 25W (Oldham wireless standalone gas monitor), DA4/DI4 (analog sensors) or radio module (when analog inputs are in use). Ensure that the appropriate value corresponding to the sensor or device is assigned to the indicated channel.

Analog Input Value
The available value is 1, 2, 3 or 4 corresponding to the input position on the DA-4/DI-4 module.

Decimal Point Value
The Decimal Point value is set to 0, 1 or 2. The number of digits displayed to the right of the decimal point of the gas concentration value is as follows:

- Sensor range is less than 10, this value will be 2.
- Sensor range is between 10 and 25, this value will usually be 1.
- Sensor range is greater than 25, the value should be 0.

Range Value
The Range value is 1-9,999 and corresponds to the gas range value of the sensor.

NOTE If the range is changed, the alarm levels will have to be reset.

CAUTION

The range value must match the range on the sensor for proper operation.

Type Value
The Type value is an alphanumeric string of nine characters and corresponds to the tag that is displayed with the gas concentration value. This field is used to define the gas concentration units and the gas type.

1. Swipe the magnet over the markers of the up or down arrows to modify the first alphanumeric character indicated by an underscore.

2. A swipe over the ENTER marker will select the displayed value and the next character to be changed will be indicated by an underscore.

3. Repeat Steps 1 and 2 to update all nine characters.

4. Swipe over the ENTER marker to return to the flashing cursor.

RL4 Bank Value
The RL4 Bank value can be 1, 2, 3, 4, 5, 6, 7, 8, or ALL and defines the total number of banks that the channels have been assigned. When selected, a new page allows the user to toggle the channel's relay bank assignments for all eight banks.

1. Swipe the down arrow marker while the flashing cursor is on RL4 BANK to scroll the display to the next channel allowing for its configuration.

2. A swipe of the up arrow marker while the flashing cursor is on SENSOR TYPE will return to the previous channel.

11.3.2 Set RF Silence and RF Sleep (Wireless Function Only)

The Set RF Silence and RF Sleep menu allows the user to initiate radio silence for a predetermined amount of time, over the entire network. RF Sleep terminates communication (sleep command) between all of the wireless radio modules in the network as a power saving feature. A longer sleep time will increase delay between alarm conditions occurring and the alarms being activated. RF Silence prevents radios from interfering with other RF devices on site (remote detonators). This feature will stay on until the user turns it off. The sensors are not monitored and no alarms can be activated while RF Silence is active.

1. Upon entering this menu, the LCD will display:

RF SILENCE AND SLEEP	
RF SILENCE:	**RF SLEEP:**
	##:##
XX	**SLEEP:XXX**

2. Swipe the magnet over the markers of the up or down arrows to move the arrow prompt "→" to the desired location. A swipe over:
   - The ENTER marker for RF SILENCE and SLEEP will toggle the value between ON and OFF.
   - The ENTER marker for RF SLEEP will select the function indicated by the arrow prompt "→".
   - The markers of the up or down arrows will change the value.
   - The ENTER marker will save the selected value.
   - The sleep timer has a range from zero to five minutes and is set in minutes and seconds.

11.3.3 Set Low Battery Alarms

Not used

11.3.4 Set Modbus™ Address

The SET Modbus™ Address menu establishes the serial address of the MX 40 controller when being polled by another master device through the RS-485 Modbus™ RTU slave port (COMM2).

1. Upon entering this menu, the LCD will display:

MODBUS ADDRESS:

###

2. This value can be changed by performing a swipe:
   - Over the ENTER marker and then swiping
   - Over the markers of the up or down arrows.
   - Another swipe over the ENTER marker will save the selected value.

3. Ensure that the range of values for the Modbus™ address is 1-127 in decimal value.

11.3.5 CXT Low Battery Threshold

Not used

11.3.6 Module Update Interval

The AO-4 outputs and battery life readings from the wireless radio modules on the MX 40 are updated periodically. This menu setting controls the rate at which these updates occur. The default rate is 60 seconds.

This value can be changed by performing a swipe:

- Over the ENTER marker and then swiping
- Over the markers of the up or down arrows.
- Another swipe over the ENTER marker will save the selected value.

11.3.7 Set COMM Baud Rates

The Set COMM Baud Rates menu displays the current baud rate settings for COMM1 (master) and COMM2 (slave).

Upon entering this menu, the LCD will display:

SET COMM BAUD RATES:

COMM1 BAUD RATE:9600
COMM2 BAUD RATE:9600

NOTE	The value shown is pre-configured to 9600 and should not be altered unless directed to do so by Oldham factory personnel.

11.3.8 Set Modbus™ Timeouts

The Set Modbus™ Timeouts menu establishes the response timeout for Modbus™ communications and the inter-poll delay. Response timeout is the amount of time in milliseconds the MX 40 controller will wait for a sensor to respond to a poll request. Inter-poll delay is the amount of time in milliseconds the MX 40 will wait after receiving a poll response from one sensor before it polls the next sensor. Ten missed poll responses will result in the sensor being declared in COMM ERR. The range of values for the response timeout is 100-1000 milliseconds and 10-255 milliseconds for the inter-poll delay. The recommended value for the response timeout is 1000 and 250 for the inter-poll delay.

1. Upon entering this menu, the LCD will display:

   SET MODBUS TIMEOUTS:

   RESPONSE TIMEOUT:###
   INTERPOLL DELAY:###

2. Values can be changed by swiping the magnet over the markers of the up or down arrows to move the arrow prompt "→" to the desired function. A swipe over:
   - The ENTER marker will select the function indicated by the arrow prompt "→".
   - The markers of the up or down arrows will change the value.
   - The ENTER marker will save the selected value.

11.3.9 Display Settings

The Display Settings menu customizes the brightness, contrast and backlight duration of the display. Values for brightness and contrast range between 0 and 100. Available values for the backlight timeout function (turn off due to inactivity) are OFF, 10 seconds, 30 seconds and 1 to 5 minutes.

1. Upon entering this menu, the LCD will display:

DISPLAY SETTINGS

BRIGHTNESS: ###
BACKLIGHT TIMEOUT: #:##
CONTRAST: ###

2. These values can be changed by swiping the magnet over the markers of the up or down arrows to move the arrow prompt "→" to the desired function. A swipe over:
   - The ENTER marker will select the function indicated by the arrow prompt "→".
   - The markers of the up or down arrows will change the value.
   - The ENTER marker will save the selected value.
   -

11.4 Spare Parts and Wireless Accessories

Part Number	Spare Parts
DET-360-ML1000-024	Power Supply 4.2A
DET-975-041402-000	DI-4 Input Module
DET-976-041400-000	DA-4 Input Module
DET-975-041401-000	AO-4 Output Module
DET-975-041400-000	RL-4 Output Module
DET-327-000000-000	Programming Magnet
DET-500-003087-100	Transient Protection Module
DET-500-005156-000	AC/DC Converter 4W
MX40-949-005142-200	NEMA 4 MX 40 Drop-In Display Control Assembly
Part Number	**Wireless Accessories**
DET-976-00132D-000	RXT-320 Transceiver Din-Rail Mounted
DET-976-0003A4-200	2.4Ghz NEMA4 8" Antenna, 8" cable
DET-960-202200-000	Condensation prevention packet (For condulet, replace annually)

11.5 Revision Log

Revision	Date	Changes made	Approval
1.0	5 Jan 2015	Initial Release.	MS

12.0 EC Declaration of Conformity

Déclaration de Conformité CE
EC Declaration of Conformity

CE

La **Société Oldham S.A.S.**, ZI Est, 62000 Arras - France, atteste que la
*The **Company** **Oldham S.A.S.**, ZI Est, 62000 Arras - France, declares that the*

Centrale de mesure MX 40
MX 40 Controller

est conforme aux exigences des Directives Européennes suivantes :
complies with the requirements of the following European Directives:

I) Directive Européenne CEM 2004/108/CE du 15/12/04**: Compatibilité Electromagnétique**
The European Directive EMC 2004/108/CEE of 15/12/04: ELECTROMAGNETIC COMPATIBILITY

Normes harmonisées appliquées: **EN 50270:**06 for type 1&2 — CEM-Appareils de détection de gaz
Harmonised applied Standards — *EMC-apparatus for the detection of gases*

II) Directive Européenne DBT 2006/95/CE du 27/12/06**: Basse Tension**
The European Directive LVD 2006/95/CEE of 27/12/2006 Concerning Low Voltage

Normes harmonisées appliquées: **EN 61010-1:10** — Règles de sécurité pour appareils électriques de mesurage
Harmonised applied Standard — *Safety requirements for electrical equipment for measurement*

III) Directive Européenne R&TTE 99/5/CE du 07/04/99 **: Equipements et installations radioélectriques**
The European Directive R&TTE 99/5/EC of 07/04/99: Radio and Telecommunications Terminal Equipment

Normes harmonisées appliquées :
Harmonised applied standards

EN 300 328 : 1.8.1 Compatibilité électromagnétique et spectre radioélectrique (ERM); Les systèmes de transmission à large bande; Fonctionnement de l'équipement de transmission de données dans la bande ISM à 2,4 GHz et en utilisant des techniques de modulation à bande large; EN harmonisée couvrant les exigences essentielles de l'article 3.2 de la directive R&TTE
Electromagnetic compatibility and Radio spectrum Matters (ERM);Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques; Harmonized EN covering the essential requirements of article 3.2 of the R&TTE Directive

EN 62479 :2010 Evaluation de la conformité des appareils électriques et électroniques de faible puissance aux restrictions de base concernant l'exposition des personnes aux champs électromagnétiques (10 MHz à 300 GHz)
Assessment of the compliance of low power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz)

Arras, le 20 mars 2015 (March 20th, 2015)

ISO 9001:2008 CERTIFIÉ
ISO 14001:2004 CERTIFIÉ

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